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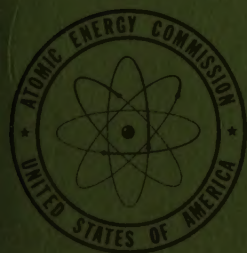
# Nuclear Science Abstracts

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# NUCLEAR SCIENCE ABSTRACTS

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## INTRODUCTION

*Nuclear Science Abstracts (NSA)* is issued twice a month by the Atomic Energy Commission (AEC). It is intended primarily to serve scientists and engineers working within the Atomic Energy Project, by abstracting as completely and as promptly as possible the literature of nuclear science and engineering. It covers not only unclassified and declassified research reports of the AEC and its contractors, but also material in its field of interest which appears in unpublished research reports of government agencies, universities, and industrial research establishments, and in the technical and scientific journals.

## DECLASSIFICATION

The issuance of these abstracts does not constitute authority for declassification of any reports.

## INDEXES

*Nuclear Science Abstracts* is indexed by personal and corporate author, by subject, and by report number. Annual index issues are prepared for each volume. A cumulated index to Vols. 1-4 was issued as Vol. 4, No. 24B, Dec. 30, 1950, covering authors, subjects, nuclides, and report numbers. The 24th number of Vols. 5, 6, and 7 contains indexes covering the individual volumes, as well as a cumulated Numerical Index of Reports covering *Abstracts of Declassified Documents (ADD)*, Vols. 1 and 2, and the previously issued NSA volumes. Issue 24A of Vol. 8 contains Author and Subject Indexes and a Numerical Index of Reports for items abstracted in that volume. This issue contains Personal Author, Corporate Author, and Subject Indexes and a Numerical Index of Reports for items Abstracted in Vol. 9. A separate publication (TID-4000, *Cumulated List of Available Unclassified AEC Reports*) contains a Numerical Index of Reports cumulated through Vol. 8 of NSA.

Each issue of Vol. 10 (1956) contains an Author Index and a Numerical Index of Reports for abstracts in that issue as well as new availability information on reports abstracted previously. Subject and Author indexes, as well as a cumulation of the Numerical Index of Reports, are issued as a supplement to the 12th issue. The 24th issue will be the annual index for the volume.

*Nuclear Science Abstracts* carries in issues 6B, 12B, 18B, and 24B lists of New Nuclear Data in which experimental results are displayed in tabular form and arranged by element and isotope, with each entry including a reference. The listing in No. 24B is the annual cumulation. The lists of New Nuclear Data are compiled by the Nuclear Data Group of the National Research Council, Washington 25, D. C. The New Nuclear Data items are also supplied by this group on 3 x 5 in. cards for \$20.00 a year domestic and about \$30.00 a year foreign (air mail postage included).

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**Translations.** The complete series (NSF-tr) of National Science Foundation translations is available at the depository libraries. Other translations from Russian are available at the Scientific Translation Center, Library of Congress, Washington 25, D. C., and translations from other foreign languages are available at the SLA Translation Pool, John Crerar Library, Chicago, Ill. The availability of translations from these centers is indicated in the Numerical Index of Reports.

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**General Information on Location of Index.** If the searcher knows the report number, he should look in TID 4000, *Cumulated List of Available Unclassified AEC Reports*, or in the Numerical Index of Reports appearing in NSA, Vol. 9, No. 1, et seq. If the searcher does not know the report number, searching is aided by the annual or cumulated subject and author indexes. The indexes refer to an abstract from which the report number may be obtained, and the information regarding availability can then be obtained from the Numerical Index of Reports. Declassified reports numbered MDCC and AECD through 2023 are indexed by subject and author in the separate *Declassified Documents Cumulated Index*, and their abstracts appear in *ADD*, the forerunner to *NSA*. These publications, as well as the first five volumes of *NSA*, are not available for sale but may be consulted at the AEC depository libraries.

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- Karachi, Atomic Energy Commission

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- Pretoria, Library and Information Division, South African Council for Scientific and Industrial Research

## UNITED NATIONS

- New York, N. Y., U.N. Headquarters

\* Also serves as an Industrial Information Depository Library.





# PERSONAL AUTHOR INDEX

For each reference the digit preceding the dash is the volume number and digits after the dash are the abstract number.

AAS E A	10-1672	ALEXANDER G	10-212	AMES D P	10-3267	ANDREWS ROBERT V	10-2708
ABBANAT R F	10-3482	ALEXANDER G E	10-795 10-1465	AMINGTON A F	10-624	ANDRONIKASHVILI E L	10-1414
ABBATIello A A	10-3577 10-3578	ALEXANDER GEORGE V	10-2973	AMMIRAJU P	10-3032	ANGELL M A K	10-3258
ABE YOSHIHITO	10-2878	ALEXANDER JAMES A	10-3523 10-3524	AMUNDSON N R	10-2695 10-3800	ANGIER R P	10-2447
ABRAMOVITZ S	10-3188	ALEXANDER P	10-445	AMY ROBERT L	10-35	ANGUS JOHN C	10-1749
ABRAMS C S	10-2660	ALEXANDER PETER	10-524 10-1283 10-1284	ANASTASEVICH V S	10-2777	ANONSEN S H	10-3413
ABRAMS CHARLES S	10-611 10-666 10-742	ALFORD M D	10-3780	ANDELIN ROBERT L	10-2655	ANTHONY D S	10-2966
ACCINELLI JOHN B	10-2980 10-2986	ALFRED UNIV ALFRED N Y	10-786	ANDERS EDWARD	10-2625	ANTHONY G W	10-376
ACCOUNTIUS OLIVER E	10-1780	ALGER R S	10-3619	ANDERSEN J R	10-883	ANTONEVA N M	10-1103
ACKROYD R T	10-1055 10-1060	ALKIRE GEORGE J	10-2291	ANDERSON A M	10-1556 10-3720	APBLETT W R	10-849
ACQUISTA N	10-1266	ALLAN D L	10-338	ANDERSON C D	10-2096	APKARIAN HARRY	10-2405
ADAIR ROBERT K	10-2136	ALLEN A M	10-242	ANDERSON CARL E	10-3046	APONYI T	10-3126
ADAM H W	10-3787	ALLEN A O	10-3480	ANDERSON E C	10-3483	ARBITTER WILLIAM	10-1392
ADAMS DONALD F	10-1743	ALLEN A W	10-2398 10-2399	ANDERSON E E	10-2506 10-3667	ARD WILLIAM B	10-1308 10-1309
ADAMS GEORGE B JR	10-561	ALLEN AUGUSTINE O	10-1274 10-2654	ANDERSON EDWARD L	10-2655	AREHART T A	10-2326
ADAMS J B	10-410 10-1295 10-1296	ALLEN D A	10-2421 10-2422 10-2423	ANDERSON ELIZABETH B	10-3773	ARGO H	10-3749
ADAMS KENNETH B	10-1297 10-3113	ALLEN D F	10-2411 10-2412 10-2413	ANDERSON ERNEST C	10-2825	ARGO HAROLD V	10-1145
ADAMS R H	10-2211	ALLEN KENNETH A	10-2414 10-2415 10-2416	ANDERSON F	10-986 10-987 10-2854	ARGO M	10-3648
ADAMSON ARTHUR W	10-1759	ALLEN M B	10-2417 10-2418 10-2419	ANDERSON GUVEREN M	10-2180	ARKHANGELSKII L V	10-466
ADDISON C C	10-206	ALLEN ROBERT C	10-2426 10-2427 10-2425	ANDERSON H L	10-280 10-281 10-435	ARMAND LOUIS	10-123
ADDISON W E	10-206	ALLEN ROBERT E	10-2947	ANDERSON J M	10-1437	ARMBRUSTER RAYMOND	10-2820 10-2822
ADENSTEDT HEINRICH K	10-1393	ALLEN S	10-2651	ANDERSON J S	10-2010	ARMISTEAD F C	10-3739
ADER MARIE	10-2929	ALLEN W D	10-1145	ANDERSON J W	10-757	ARMSTRONG G M	10-3543
AGEEV N V	10-882	ALLEN W D	10-250 10-428 10-975	ANDERSON LEIGH C	10-1280	ARMSTRONG R D	10-3097 10-3257
AGOSTINI L	10-133	ALLEY N P	10-1596	ANDERSON MELVIN S	10-2722	ARNFELT ANNA-LISA	10-2691
AGRON P A	10-2370	ALLIEGRO R A	10-1907	ANDERSON R CHRISTIAN	10-1252 10-1758 10-2652	ARNOLD E D	10-3248
AGUILAR J	10-314	ALPEN EDWARD L	10-790	ANDERSON ROGER A	10-2722	ARNOLD J S	10-558
AHRENS L H	10-2712	ALPEROVITCH EDWARD A	10-16	ANDERSON S	10-3608	ARNOLD J T	10-2221
AISTOVA R I	10-1226	ALPERS V V	10-170 10-2625	ANDERSON W A	10-2027 10-2221	ARNOLD JAMES T	10-201
AITHAL V SEETHARAM	10-1744	ALSTAD C D	10-2695 10-3800	ANDERSON WESTON A	10-201	ARNOLD S V	10-2435
AKHIEZER A	10-1964	ALTER H WARD	12-1366 10-2254	ANDERSSON B	10-2837	ARNOLD W	10-2568
ALAGA G	10-366	ALTMANN S L	10-1492	ANDERSSON GEORG	10-1850	ARNOLD W H JR	10-2137
ALBERT A	10-1204	ALTSHULER CHARLES H	10-3767	ANDREESCHCHEV E	10-2846	ARONSON R	10-1496
ALBERTS A A	10-3492	ALTWEIN D W	10-1332	ANDREEV A I	10-1132	ARRHENIUS GUSTAF	10-1802
ALBRECHT W M	10-844 10-2080 10-3356	ALVAREZ LUIS W	10-285	ANDREEVA M V	10-3269	ASARO FRANK	10-454 10-461 10-2208
ALBURGER D E	10-2202	ALVIAL G	10-2854	ANDRESEN A W	10-2045	ASBURY I	10-2209
ALDER KURT	10-1541	AMALDI E	10-304	ANDREW A	10-3882	ASH MILTON	10-3556
ALDERMAN ILO M	10-1191	AMATI D	10-323	ANDREW ALAN	10-3322	ASH J	10-3236
ALDRICH J J	10-1173	AMBERSON C B	10-3475	ANDREW E R	10-1920	ASHKIN J	10-3646
ALDRICH L T	10-937	AMDUR BENJAMIN	10-3414	ANDREWS G B	10-9089	ASKARYAN G A	10-2819
ALEKSEEVSKII N E	10-197 10-2802	AMERICAN CYANAMID CO	10-3118	ANDREWS GOULD A	10-3773	ASLING C WILLET	10-1694
ALEKSIN V	10-1964			ANDREWS HARRY C	10-3053	ASPREE L B	10-2210
ALEXANDER B H	10-3818			ANDREWS HOWARD L	10-1705	ASTBURY J P	10-212
				ANDREWS L J	10-3530 10-3538	ASWATHANARAYANA U	10-440

- ATCHISON GEORGE J  
 10-2632  
 ATEN A H W JR  
 10-93 10-637 10-1022  
 ATKINS M C  
 10-96  
 ATTIX F H  
 10-1472  
 AUERBACH T  
 10-1000 10-3154  
 AURIVILLIUS BENGT  
 10-1258 10-1259  
 AUSTERMAN STANLEY B  
 10-1269  
 AUSTERN N  
 10-2233  
 AUSTIN A E  
 10-3787  
 AUSTIN ALFRED E  
 10-1270  
 AVAN LOUIS  
 10-1848  
 AVAN MADELEINE  
 10-1848  
 AVDESNSYK M A  
 10-2018  
 AVEN R E  
 10-2531 10-2534  
 AVERBACH B L  
 10-183 10-184 10-1383  
 10-1384 10-1385 10-2069  
 10-2081 10-2082 10-3012  
 10-3285  
 AVERIN E K  
 10-1339  
 AVES R  
 10-965  
 AYERS A S  
 10-2378 10-3427 10-3485  
  
 BABAREKO A A  
 10-882  
 BACH J H  
 10-3762  
 BACHOFER C S  
 10-2587  
 BACKENSTO A B JR  
 10-3613 10-3614  
 BACKOFEN WALTER A  
 10-828  
 BACKUS J G  
 10-1664 10-3068  
 BACON A  
 10-605 10-1233  
 BACQ Z M  
 10-524  
 BAER WILLIAM  
 10-431  
 BAES C F JR  
 10-721 10-2685  
 BAGGERLY L L  
 10-2203  
 BAGLEY K O  
 10-1371  
 BAILES R H  
 10-566 10-676 10-677  
 10-678 10-679 10-680  
 10-681 10-682 10-683  
 10-684 10-685 10-686  
 10-687 10-688 10-689  
 10-690 10-691 10-692  
 10-693 10-694 10-695  
 10-696 10-697 10-698  
 10-699 10-700 10-701  
 10-702 10-703 10-704  
 10-705 10-706 10-707  
 10-708 10-709 10-710  
 10-711 10-712 10-713  
 10-714 10-715 10-716  
 10-717 10-745 10-1289  
 10-2044 10-3180 10-3790  
 BAILEY J C  
 10-1703 10-1994  
 BAIR J K  
 10-346  
 BAIRBANKS F B  
 10-1563  
 BAKER B L  
 10-1699  
 BAKER BURTON L  
 10-3767  
 BAKER D JR  
 10-2536  
 BAKER E E  
 10-2481  
 BAKER E W  
 10-2201  
 BAKER J M  
 10-480 10-1532  
 BAKER JAMES A  
 10-3303  
 BAKER MELVIN C  
 10-70  
 BAKER W M  
 10-221  
 BAKER W R  
 10-1690 10-1691  
 BAKES S E  
 10-3505  
 BAKKER C J  
 10-419  
 BALAGNA J P  
 10-459  
 BALASHOVA N A  
 10-736  
 BALDIN A M  
 10-2851  
 BALDOCK C R  
 10-3140  
 BALDOCK RUSSELL  
 10-2107 10-3176  
 BALDWIN E E  
 10-2073 10-3198  
 BALDWIN JOHN  
 10-2191  
 BALDWIN M M  
 10-1202  
 BALDWIN W H  
 10-3593  
 BALDWIN W M JR  
 10-1373 10-1805 10-2078  
 10-2723 10-3280 10-3281  
 BALDWIN WILLIS H  
 10-579 10-618  
 BALE WILLIAM F  
 10-545  
 BALES H W  
 10-3096 10-3771  
 BALES W E  
 10-1789  
 BALKWELL W R  
 10-2059  
 BALLANTINE DAVID S  
 10-3179  
 BALLARIO C  
 10-212  
 BALLAY M  
 10-2705  
 BALLIN JOHN C  
 10-1990  
 BALLOU N E  
 10-1288  
 BALLWEG L H  
 10-2508  
 BAMBERG J L  
 10-3552  
 BAME SAMUEL J JR  
 10-1145  
 BANASEVICH S N  
 10-1736  
 BANCROFT A R  
 10-202  
 BANE R W  
 10-3428 10-3549  
 BANERJEE GURUPADA  
 10-1245  
 BANKS CHARLES V  
 10-609 10-1742  
 BANKS E  
 10-1752  
 BANKS H O JR  
 10-1260  
 BANNIK B P  
 10-1073 10-2901  
 BANNING LLOYD H  
 10-1735 10-1808  
 BARABASCHI S  
 10-2791  
 BARANKIN E  
 10-3750  
 BARANOV P S  
 10-2818  
 BARCHUK I F  
 10-253  
 BARDOCK T R  
 10-3515  
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 BASEL UNIVERSITAT  
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 BASHILOV A A  
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 BENGSTON JOEL  
 10-3850



BENNELICK E J  
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 BINDER GEORGE A  
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 BING GEORGE  
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 BISHOP H F  
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 BIZZELL O M  
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 BOONE JAMES L  
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 BOOTH ANDREW D  
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 BOOTH G W  
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 BOPP C D  
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 BORELI F  
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 BORELI FEDOR  
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 BORGARDT A A  
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 BORIE B S JR  
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 BOYAJIAN A  
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 BOYD G E  
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 BRADLEY DAN F  
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BRUBAKER R C  
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BRUNELLI B  
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BRUNISH ROBERT  
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BRUNSTETTER D R  
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BUCK JOHN H  
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BUDZINSKI E E  
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BUFORD M A  
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BUYERS A G  
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BUZZARD R W  
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CAILLAT ROGER  
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CAIN E F C  
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CALLIHAN A D  
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CASARETT LOUIS J  
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CASE K M  
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10-815





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CREW R J  
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CUNNINGHAM J R  
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CURRAN S C  
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CZYZ W  
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DOWNING R C  
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DRABKIN G M  
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DRABKIN M L  
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DRAIN L E  
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DRELL S D  
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DRESNER LAWRENCE  
10-3219



DREVER R W P  
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 DUCHESNE JULES  
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 DUFFEY J  
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 DUNHAM CHARLES L  
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 EDGELL WALTER F  
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 EDWARDS A B  
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 EDWARDS DAVID F  
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 EDWARDS GAIL P  
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 EDWARDS S F  
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 EGAN C J  
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 EGGLESTON R R  
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 EHLERS KENNETH W  
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 EHRLICH R  
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 ELAM D W  
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 EMERY A H JR  
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 ENDEBROCK R  
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 ERNST W  
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 ESTERBROOK E G  
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 FAIRBOURNE S F  
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FUCHS LOUIS M  
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FUKUI SHUJI  
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FULDA M O  
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FULLER DUDLEY D  
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FULLER E J  
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FURUICHI JIRO  
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FURUKAWA GEORGE T  
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FYEDOROV G B  
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- GABILLARD R  
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GALE RICHARD H  
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GALONSKY A  
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GATES J W JR  
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 GOES MARIE-LOUISE  
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 GOLDHABER S  
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 GOLDHOFF R M  
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 GOLDMAN M  
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 GRIGGS BRUCE  
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GRIGOROV N L	HAAS LEWIS L	HANSEN LELAND A	HATCH L P
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GRILLI M	HABER-SCHAIM U	HANSEN ROBERT S	HATCH M H
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GRIM M S JR	HABERMAYER J G	HANSEN WALLACE R	HATCH T F
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GRIMAUD A V	HABETLER G J	HANSON A O	HATFIELD G W
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GRIMELAND B	HACKMAN R J	HANSON D N	HATFIELD NATHAN S
10-269	10-162 10-163 10-164	10-2461	10-3121
GRIMES W R	10-165 10-166	HANSON DONALD N	HAUBENREICH P N
10-2995 10-2996 10-3182	HADDEN F A	10-629	10-2534 10-3666
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10-3532 10-3533	HADDOCK ROY P	10-1044 10-1052 10-1087	10-1783
GRINSTED R R	10-3847	HANSON GEORGE H	HAUDENREICH P N
10-1287	HADI J	10-1144	10-3744
GRINSTED ROBERT R	10-875	HANSON K L	HAUFFE K
10-3122	HAECKL F	10-119	10-1431
GRJOTHEIM K	10-3127	HANWAY J E JR	HAUFFE KARL
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GROFF D W	10-1458	HAPP G P	HAUSNER H H
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GROJOTHEIM K	10-3053	HAPP M B	HAVENS W W JR
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GRONVOLD F	10-209	HARBOTTLE GARMAN	HAVLICEK F I
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GRONVOLD FREDRIK	10-1439	HARDY R C	HAWKINS N J
10-2047	HAGIWARA SHIGEO	10-3463	10-1312 10-2213
GROOT C	10-2878	HARE PETER E	HAWORTH DANIEL T
10-792 10-3107	HAHN BEAT	10-222	10-444 10-1106
GROSCH DANIEL S	10-1014	HARKER W H	HAYAKAWA SATIO
10-2609	HAHNE HELEN JO	10-3643	10-1902 10-2868
GROSHEV L V	10-1186	HARKNESS A L	HAYDON HELEN
10-3224	HAIGHT G P JR	10-353	10-3259
GROSS JOHN H	10-1239	HARLEY P H	HAYDON M P
10-1295 10-1296 10-1297	HAINES H R	10-3675	10-2408 10-2409 10-2410
GROSS W	10-1648	HARLOW HARRY F	10-2411 10-2412 10-2414
10-2840	HAJDUKOVIC S	10-520	10-2420 10-2421 10-2422
GROSSE A V	10-3802	HARMER DAVID E	HAYES E T
10-2356	HAJDUKOVIC S	10-1280 10-2025	10-3284
GROSSMAN NICHOLAS	10-541	HARMON M K	HAYES F NEWTON
10-854	HALD ANN M	10-2381 10-2382	10-1477 10-2827 10-2831
GROSSWEINER L I	10-1187	HARMON NORMAN FREDERICK	HAYES THOMAS L
10-2214	HALE WILLIAM M	10-2127	10-1154
GROVE D J	10-8	HARPER D D	HAYFORD D A
10-2102	HALEY THOMAS J	10-1390	10-1213
GROVE G R	10-2967 10-3328	HARPER E A	HAYNES W B
10-3300	HALL G R	10-1256	10-2084
GROVER H J	10-458	HARRIS C C	HAYS E E
10-866	HALL JANE H	10-972	10-1687
GRUCCI T	10-2540	HARRIS F B	HAYWARD JAMES C JR
10-1698	HALL L L	10-219	10-654
GRUNER JOHN W	10-2415	HARRIS G	HAYWOOD C A
10-3130	HALLER KURT	10-1486	10-427
GRUTTER F	10-2229	HARRIS SOLISKA R	HAZEN W C
10-408	HALPERN J	10-3094 10-3326	10-757
GRUZIN P L	10-2182	HARRIS W E	HEADRIDGE JAMES B
10-3364	HALTER D E	10-2667	10-1307
GUARD R W	10-1808	HARRIS WILLIAM B	HEAL K G
10-192	HALTER J	10-10 10-851 10-1159	10-106
GUARNIERI G J	10-1956 10-1958	HARRISON A D R	HEALY J W
10-142 10-835	HAMAKER J W	10-1306	10-1203 10-2294
GUHL H	10-3432	HARRISON E R	HEALY R M
10-1958	HAMER WALTER J	10-2903	10-3176
GUILLET L	10-2094	HARRISON F B	HEALY T V
10-2705	HAMERMESH M	10-319	10-1773
GUINN V P	10-902	HARRISON G R	HEALY W C JR
10-254	HAMERMESH MORTON	10-1523	10-2339
GULEVICH WLADIMIR	10-274 10-275	HARRISON GEORGE R	HEARD HARRY G
10-754	HAMILL WILLIAM H	10-3309	10-1081 10-2181
GULLIKSON C W	10-2641	HARRISON RALPH J	HEARON J Z
10-1264	HAMILTON D C	10-1270	10-1986
GUMBEL EMILE	10-129	HARRISON W B	HEARON JOHN Z
10-3460	HAMILTON DONALD R	10-2380	10-1181
GUNDERLOY FRANK	10-2104	HART E W	HEATH R L
10-1219	HAMILTON JOSEPH G	10-3821	10-1907 10-3147
GUNN STUART R	10-1694	HART EDWIN J	HEATON LEROY
10-236	HAMMEL E F	10-100 10-1273	10-3020
GUNSALUS I C	10-200	HART OLIN M	HECKEL V K
10-2673	HAMMEL J E	10-802	10-2789
GUPTA J	10-400	HARTH E M	HECKMAN A L
10-730	HAMMOND CAROLYN W	10-282	10-3716
GUPTA U C	10-96 10-1185	HARTMAN J A	HECKMAN HARRY H
10-1525	HAMMOND R PHILIP	10-956	10-979 10-3304 10-3848
GUREVICH I I	10-1067	HARTMAN L M	HECKMAN R A
10-2143 10-2849 10-2850	HAMNER K C	10-1001	10-1938
10-3223	10-508	HARTMANN B	HEDDEN W A
GURKLIS J A	HANCHER C W	10-1025	10-2022
10-1367	10-2326	HARTMANN E C	HEER E
GURNEY J	HANCOCK D A	10-2075	10-1912 10-1913 10-1955
10-3346	10-1531	HARTMANN M	10-1957
GUSTAFSON TORSTEN	HANDA DOROTHY T	10-238	MEERENA N
10-1516	10-523	HARTSOUGH WALTER	10-2276
GUTFREUND W	HANDLEY T H	10-3239	HEFT ROBERT E
10-509 10-3776	10-365 10-2152 10-2199	HARVEY B G	10-1578
GUTHRIE A	10-3243	10-454	HEIDT HENRY M
10-926 10-927 10-938	HANDLOSER J S	10-1985	10-3113
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GYDESEN F R	HANKES LAWRENCE V	10-3442	10-1936
10-2481	10-557	HASEGAWA HIROICHI	HEINCKER R
	HANLE W	10-1970	10-2597
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	10-2057	10-5 10-7	10-3214
HAAG RUDOLF	HANS H S	HASKIN D M	HEINTZ JOHN WADE
10-2963	10-432	10-905 10-2130 10-2138	10-3363
HAAR LESTER	HANSELL PATRICIA R	HASKOVA VERA	HEISENBERG W
10-1726	10-1252	10-7	10-296



HEISTG D L  
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HELMER R G  
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HEMMENDINGER ARTHUR  
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HOUSKOVA MARIE  
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HOWARD WESTON M  
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HOWE J T  
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HOWELL L J  
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HOWES J H  
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HOWLAND P R  
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HOWTON DAVID R  
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HOYT E W  
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HRABA ROMAS  
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HSEU TONG MING  
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HUASCHEN R E  
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HUBBARD HARMON W  
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HUBBELL HARRY H JR  
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HUBER ELMER J JR  
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HUBER M  
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HUBER O  
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HUDSON E D  
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HUGGINS JOHN C  
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HUIZENGA J R  
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HULET E K  
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HUME-ROTHERY W  
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HUME-ROTHERY WILLIAM  
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HUNGERFORD H E  
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HUNT H  
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HURFORD W J  
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HURSH J B  
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HURSH JOHN B  
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HURWITZ H JR  
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HURWITZ HENRY JR  
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HURZELER H  
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HUSTON S H  
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HUTCHINSON W P  
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HUTCHISON CLYDE A  
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HYDE E K  
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HYDE J L  
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HYLER W S  
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IBSER H W  
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ICE C H  
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IEYSE CARL F  
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IGNATENKO A E  
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IGNATOWSKI J R  
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IGO G  
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ILIFFE C E  
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ILSCHNER B  
10-1431 10-2085  
IMAEDA KUNI  
10-2853

IMHOFF D H	JAHSMAN W E	JOHNSTON A HELEN	KAMM R L
10-3642	10-119	10-528	10-3680
IMIRIE G W JR	JAKOB A	JOHNSTON C P	KAMM ROBERT
10-3422	10-2000	10-3575	10-2350
INGHAM H	JAKOBSON MARK	JOHNSTON HERBERT RAYMOND	KAMMERER OTTO F
10-1944	10-1587	10-1467	10-2925
INGLIS LEO P	JAMES D B	JOHNSTON MURIEL E	KAMMERMEYER KARL
10-3316	10-962	10-1694	10-209
INOUE H	JAMES J A	JOHNSTON R H W	KANDEL R J
10-3606	10-1746	10-2854	10-2831
INTHOFF W	JANCEL R	JOHNSTON W V	KANE E D
10-1007	10-1854	10-2023	10-1332
IPPOLITO F	JANECKE E	JOHNSTONE H F	KAPLAN I
10-1787	10-1731	10-134	10-2513 10-3037 10-3311
IREDALE P	JANTSCH G	JOLLEY W P	10-3390
10-2854	10-3778	KAPLAN IRVING	10-3713
IRISOVA N A	JARRETT ALAN A	JOLY R	KAPLAN LOUIS
10-930	10-1495	10-1956	10-935
IRVINE JOHN W JR	JASTROW R	JONAS HERBERT	KAPLAN S J
10-1304	10-292	10-255	10-1166
ISAACSON EUGENE	JAUDAL C	JONES A G	KAPLON M F
10-2805	10-1184	10-3535	10-220
ISAEV B M	JAUMOT F E JR	JONES J O	KAPLOW R
10-2846	10-2769 10-3369	10-662 10-1322	10-183
ISAEV P S	JEAN MAURICE	JONES J W	KARAVAEEV N M
10-2957	10-1535	10-3725	10-770
ISBIN H S	JEFFERSON S	JONES LLEWELLYN H	KARDASHEV N S
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ISERSON HYMAN	JENKINS I	JONES R J	KARELITZ M B
10-739	10-1842	10-1671	10-333 10-980
ISHIMATSU TOSHIYUKI	JENKINS I L	JONES ROBERT L	KARELITZ MICHAEL B
10-2862	10-2011	10-1720	10-2848
ISHIMORI TATSUJIRO	JENKINS JOE E	JONES ROBERT W	KARPLUS ROBERT
10-2798	10-234	10-1716	10-494
ISLER R	JENSEN E N	JONES RONALD K	KASSEL K
10-2252	10-1518 10-2207	10-29	10-3264
ISONO TOSHIAKI	JENSEN LOUIS K	JONES W M	KASYANKOV P P
10-2944	10-3044	10-452 10-2348	10-227
ISOYA AKIRA	JENSON ROSE E	JORDAN K C	KATCHMAN B J
10-2910	10-26	10-1839	10-3252 10-3777
ITO DAISUKE	JERMAIN ROSE V	JORDAN P	KATCHMAN BERNARD J
10-1917 10-2855	10-3223 10-3238 10-3242	10-1954	10-511
IVANKO D	JESPERSEN M W JR	JORDAN W H	KATES L W
10-1627	10-1356	10-3698	10-3819
IVANOV K P	JESSE WILLIAM P	JORGENSEN CHR KLIXBULL	KATZIN LEONARD I
10-2582	10-2924	10-326	10-1220 10-1494
IVANOV L I	JETTE E R	JOSEPHY B	KATZMAN J
10-898	10-2568	10-3849	10-2759
IVANOV N S	JEWELL W R	JOY E F	KAUER E U
10-1070	10-2465	10-2727	10-321
IVANOV YU S	JEWEIT W O	JUDD B R	KAUFMAN DAVID
10-1073 10-1149 10-2238	10-3469	10-1493	10-2998
10-2901	JODRA L GUTIERREZ	JUDISH J P	KAUFMAN WARREN J
IVANOVA V S	10-1326	10-433	10-1327
10-881	JOGLEKAR G D	JUDSON CHARLES M	KAUFMANN A R
IVASH E V	10-729	10-3420 10-3421	10-3055
10-469	JOHANSSON SVEN A E	JUENKER D W	KAULITZ D C
IVORY W	10-1603 10-1610	10-1400	10-1034 10-1446
10-145	JOHNS CHARLES GLENN	JUNKINS J H	KAUZHANN WALTER
IWADARE JUNJI	10-2970	10-3555	10-2797
10-1967	JOHNS H E	JURAIN GEORGES	KAVERKIN I P
IWAMOTO REYNOLD T	10-978	10-809	10-1414
10-1247	JOHNS I B	JURICH SAMUEL	KAWAI MITSUJI
IWASE EIICHI	10-3505 10-3507	10-2731	10-2955
10-2944	JOHNS M W	JURY S H	KAWAI NAWOYUKI
IYENGAR S B D	10-2927 10-2945	10-2338	10-2862
10-1505	JOHNSON A E	JUVINALL GORDON L	KAY W B
IZZO T F	10-2404	10-1214	10-764
10-666 10-1302 10-1303	JOHNSON C E	KACZMAREK T B	KAYAN CARL F
10-1323 10-2660 10-2986	10-2148	10-175	10-3354
10-3344 10-3799	JOHNSON C H	KAFITZ PETER	KAZANJIAN A R
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	JOHNSON D J	KAGAN I U M	KAZANTSEV B I
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JACKSON DUDLEY P	JOHNSON DOROTHY M	KAHAN T	KAZUNO MITSUKO
10-9	10-2343	10-1854	10-2853
JACKSON H K	JOHNSON E B	KAHN BERND	KEARNS W H
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JACKSON JEAN A	JOHNSON E R	KAHN J S	KEATING F RAYMOND JR
10-606	10-3120	10-149	10-1204
JACKSON L R	JOHNSON F A	KAIDANOVSKII N L	KEEFE D
10-1820	10-1908	10-1421	10-990 10-991 10-2854
JACOB A	JOHNSON G L	KAKIHANA HIDETAKE	KEELER J H
10-1155	10-2972	10-2668	10-188 10-198
JACOBSON A	JOHNSON GORDON W	KALASHNIKOV B P	KEELER J R
10-1712	10-180	10-527	10-3009 10-3810 10-3815
JACOBSON LEON O	JOHNSON H A	KALASHNIKOV YA A	KEHL GEORGE L
10-3167	10-1336 10-1937 10-2539	10-766	10-867 10-3357
JACOBSON LILLIAN E	JOHNSON J R	KALASHNIKOVA V I	KEILINA R JA
10-2839	10-2701	10-335	10-1172
JACOE P W	JOHNSON LAURA A	KALIKHMAN L E	KEILINA R YA
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JACQUET P A	JOHNSON OGDEN	KALININ S P	10-611
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JACQUET PIERRE A	JOHNSON OLIVER	KALKSTEIN M I	10-2336 10-3625
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JAFFE A A	JOHNSON P A	KALKWARF D R	10-2438
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JAFFE H	JOHNSON R D	KALLMANN HARTMUT	10-826
10-2206	10-2554	10-251	KELLER D L
JAFFE L D	JOHNSON V R	KALOS H H	10-3815
10-627	10-203	10-2232	KELLER E H
JAFFEE R I	JOHNSON W E	KAMEI ICHIRO	10-2704
10-844 10-856 10-2702	10-1399	10-41	KELLER E K
10-2715 10-2728 10-2729	JOHNSON W H	KAMINKER D M	10-75
JAFFEE ROBERT I	10-2725	10-1943	KELLER GEOFFREY
10-1387 10-1388 10-1389	JOHNSON W N	KAMINKEZ D M	10-920
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JAGGER JOHN	JOHNSON K O		
10-31	10-2570 10-3186 10-3798		



KELLER WILLIAM E  
 10-1417  
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 KERRY J P  
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 KERST D W  
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 KERZE F  
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 KHOLNOV YU V  
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 KHROMCHENKO L M  
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 KHUTSISHVILI G R  
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 10-1934  
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 KLEMPERER WILLIAM  
 10-2216  
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 KNOTT HAROLD W  
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 KNOX FRANK A  
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 KO R  
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 KO ROY  
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 KOBOZEV I I  
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 KOCH R  
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 KOFOED-HANSEN O  
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 KOFOID M J  
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 KOFSTAD PER  
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 KOHLER S  
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 KOHN HENRY I  
 10-34  
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 KOJIMA SHOJI  
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 KOKOMOOR KATHERINE L  
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 KONIGSMARK T A  
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 KONOPINSKI E J  
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 KOONTZ ROSCOE L  
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 KORENMAN I M  
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 KORFF S A  
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 KORSUNSKII M I  
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 KOSOVICH V M  
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 KOYAMA K  
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 KRAMER B R  
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 KRAMER P  
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 KRANZ A Z  
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 KRASNOVSKY A A  
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 KRAUS CHARLES A  
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 10-885 10-995  
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 KREHBIEL DELMAR D  
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 KREIDL NORBERT J  
 10-2829  
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 KREKLER KARL  
 10-3823  
 KRESTINSKAYA T V  
 10-24  
 KREUZMANN A B  
 10-3120  
 KREVANS JULIUS R  
 10-9  
 KRIEGER HERMAN L  
 10-1328  
 KRITVE WALTER F  
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 KRIMIAN A V  
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 KRIMMEL JOHN A  
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 KRIPYAKEVICH P I  
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 KROGH-MOS J  
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 KROGEMIX JAMES  
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 KROP STEPHEN  
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 KROPP ALLEN  
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 KROSS R D  
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 KROTKOV R  
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 KRUCOFF D  
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 KRUH R F  
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 KRYNITSKY J A  
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 KUHL O A  
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 KUHLMAN C W  
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 KUHN D W  
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 KUHN RUDOLF  
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 KUNNS L J  
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 KULP BERNARD A  
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 KUNSTADTER J W  
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 KUNZ W E  
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 KUPRIYANOV C E  
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- KURSANOV D N  
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KUSTOVA A V  
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KUTSENKO A V  
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KWASNOSKI T  
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KYGER J A  
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- LA FORCE R C  
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LACHANGE LEO E  
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LACOMBE PAUL  
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LACY C E  
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LADU M  
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LAFFERTY R H JR  
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LAFFERTY ROBERT H JR  
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LAFORGUE ALEXANDRE  
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LAGASSE ALPHONSE  
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LAJINESS WAYNE G  
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LALOVIC BRANISLAV  
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LAMB W P  
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LAMB W X JR  
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LAMBE JOHN  
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LAMONDS H A  
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LAMP BEVERLY G  
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LAMPHERE R W  
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LANDON H H  
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LANDSHOFF ROLF  
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LANE J A  
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LANE JAMES A  
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LANG C  
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LANG GERHARD P  
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LANG S M  
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LANG T P  
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LANGER B F  
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LANGER J S  
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LANGERON JEAN-PAUL  
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LANGEVIN-JOLIET HELENE  
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LANGHAM WRIGHT M  
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LANZL LAWRENCE H  
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LAQUER HENRY L  
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LARENZ R W  
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LARSSON LARS-GUNNAR  
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LASHKO N F  
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LASIEWICZ K  
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LASSEN N O  
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LASZLO DANIEL  
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LATTER A  
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LAUBENSTEIN R A  
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LAUBITZ M J  
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LAURIN JEAN GUY  
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LAVATELLI L S  
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LAWLER HELEN M  
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LAWLER-WILSON CLIVE  
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LAWLOR FRANCIS E  
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LAWLOR G  
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LAYTON THOMAS W  
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LE COUTEUR K J  
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LEACH J S L  
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LEADERS W M  
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LEAP H E JR  
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LEARY J A  
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LEAVITT MINARD A  
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LEBOEUF M B  
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LEDERER M  
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LEE CHENG-CHUN  
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LEE D A  
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LEENOV DANIEL  
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LEFEVRE HARLAN W  
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LEFFLER A J  
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LEFORT M  
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LEGVOLD S  
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LEHMANN PIERRE  
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LEHR PIERRE  
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LEIPUNSKII O I  
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LENEL F V  
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LENHART R  
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LENNING G A  
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LENNOX D H  
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LEONARDI A  
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LEONE CHARLES A  
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LESEM L B  
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LESLIE GENE EDWARD  
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LESLIE ROBERT T  
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LESNYKH D S  
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LEVIN A I  
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LEVINSON DAVID W  
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LEVINTOV I I  
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LEVY PAUL W  
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LEVY-MANDEL F  
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LEWIN RUTH  
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LEWIN S Z  
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LEWIS A B  
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LEWIS ANNE  
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LEWIS D  
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LEWIS WILLIAM BRADLEY  
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LEYSE C F  
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LIBBY W F  
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LINCH A L  
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LINDNER L  
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LINDSEY A J  
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LINE L E JR  
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LIPTON S  
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LOCK C J L  
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LOEB D B  
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LOFGREN NORMAN L  
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LOISELLEUR J  
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 LONG WILLIAM G  
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 LONSJO O  
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 LORD E J  
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 LOTTERMOSE A  
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 LOWRY JOAN L  
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 LUISA A PEREZ  
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 LUKENS H R JR  
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 10-2019  
 NABLO S V  
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 NARVER DAVID L JR  
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 NASH A L  
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 NATAF ROGER  
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 NAUTA H  
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 NEELAKANTAN K A  
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 NEELY W D  
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 NESHFOR V S  
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 NETHAWAY R D  
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 NEWKIRK HERBERT W  
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 NONAKA ITARU  
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 NORHAFT P C  
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 NORMAN R J  
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 NUNOGAKA KAN-ICHI  
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 NURIN A N  
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 NUSBAUM RALPH E  
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 NYER W E  
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 OAKBERG EUGENE F  
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 OBENSHAIN F  
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 OBENSHAIN F E  
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 10-1194  
 OBRIEN INEZ  
 10-2454  
 OBRIEN J P  
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 OBRIST A  
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 OCCHIALINI G  
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 OCEALLAIGH C  
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 OCKENDEN HEATHER M  
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 OCONNOR T L  
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 ODEBLAD ERIK  
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 ODING I A  
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 OEHRM REINHARD  
 10-2230

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- OGILVIE K W  
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- OGLE PEARL REXFORD JR  
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- OHLINGER L A  
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- OHMART PHILIP E  
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- OKAZAKI RYOKUCHI  
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- OKRENT DAVID  
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- OKUV L B  
10-1892
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- OPPENHEIMER J R  
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- ORR WILLIAM C  
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- OSBORN R K  
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- OSIPOV B D  
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10-104
- OSTRANDER N C  
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- OSTROUMOV V I  
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- OSWALD LARRY  
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- OSWALT R L  
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- OVADIA J  
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- PAIS A  
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- PALKIN A P  
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- PALKO A A  
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- PALMA M U  
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- PALMER R R  
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- PALUMBO D  
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- PANI I E  
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- PAPP E  
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- PATTERSON E D  
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- PATTERSON LOUISE D  
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- PAYNE H  
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10-340
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- PERROS THEODORE  
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- PERRY P R  
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- PETRUSEVICH V A  
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- PETRUSKA J A  
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- PETRY G  
10-1156



PETTENGILL GORDON H  
 10-1090  
 PETTIT E N  
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 PEYROU CH  
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 PHALNIKAR C A  
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 PHILBERT GEORGES  
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 PHILLIPS E C  
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 PHILLIPS G C  
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 PHILLIPS R  
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 PHIPPS T E  
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 PICCIONI O  
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 PICK ROBERT  
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 PICKARD D F  
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 PICKWICK F JR  
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 PIERCE OGDEN R  
 10-2020  
 PIETERSE A C  
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 PIMENOV N YA  
 10-2018  
 PINKSKER I SH  
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 PIPKIN FRANCIS M  
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 PIRIE ANTOINETTE  
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 PISH GEORGE  
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 PITT B M  
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 PIVOVAR L I  
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 PLASS GILBERT N  
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 PLATE WERNER  
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 PLATZER R  
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 PLAUTZ DONALD A  
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 PLEASANTON FRANCES  
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 PLIVA JOSEB  
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 PODGOR S  
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 POE A J  
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 POIANI G  
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 POLING E L  
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 POLISSAR M J  
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 POLKINGHORNE J C  
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 POLLACK A  
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 POMERANCHUK I  
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 POPOV M M  
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 POSEY J C  
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 POSYPAIKO V I  
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 POUND D C  
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 PREINING O  
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 PREUSS AL  
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 PREVOT ISABELLE  
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 PREVOT-BERNAS ANNETTE  
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 PRICE G  
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 PRICE G A  
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 10-1812  
 PRICE PHILIP B  
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 PRIEST HOMER F  
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 PRIGOGINE I  
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 PRIKHODTSEVA V P  
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 PRIMAK W  
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 PROCTOR B E  
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 PROCTOR BERNARD E  
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 PROPST R C  
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 PROSKURNIN M A  
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 PROUDFOOT E A  
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 PROVOW D M  
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 PRUDKOVSKII G P  
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 PRUETT JOHN R  
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 PRUETT RICHARD D  
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 PRUNA M  
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 PUCHEROV N N  
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 PUGACHEVICH P P  
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 PUGLIESE LOUIS T  
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 PULSFORD E W  
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 PULSIFER VERNE  
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 PURCELL VINCENT I  
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 PUROHIT S N  
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 PUSIKOV L D  
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 PUTMAN J L  
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 PUTNAM JANF M  
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 PUZAK P P  
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 PYLE G L  
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 PYLE GRAY L  
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 PYLE ROBERT V  
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 QUARENI G  
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 QUASTLER HENRY  
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 QUILL LAWRENCE L  
 10-1817  
 QUINN G F  
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 QUINN GEORGE F  
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 RAATZ W A  
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 RABIDEAU S W  
 10-1763  
 RABINOVICH I B  
 10-2018  
 RABINOWITZ EUGENE I  
 10-3766  
 RADCHENKO I V  
 10-1096  
 RADETZKAYA E M  
 10-1824  
 RADICATI L A  
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 RADIMER K J  
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 RADKOWSKY A  
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 RAE H K  
 10-202  
 RAEUCHLE RICHARD F  
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 RAGAN NANCY  
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 RAGHAVIA RAO BH S V  
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 RAINE W J  
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 RAINES M M  
 10-3269  
 RAINWATER L J  
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 RAJAN K S  
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 RAKA E C  
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 RAKSZAWSKI J F  
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 RALEY CHARLES F JR  
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 RAMACHANDRAN A  
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 RAMAMURTHY S  
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 RAMSEY J W  
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 SANBORN KENNETH L  
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- SHERR R  
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- SHOLL W E  
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- SIEGEL STANLEY  
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- SIEMAR WILLI  
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- SIGAL MARLOW A  
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- SIMON ALBERT  
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SPEDDING F H  
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 STERMAN L S  
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 STERMON R III  
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 STERN H E  
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 STERNHEIMER R M  
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 STILMAR F III  
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 STOLL P  
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 STONE J F  
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 STONER RICHARD D  
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 STOOPS ROBERT F  
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 STOPPINI G  
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 STORER JOHN B  
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 STORK DONALD H  
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 STOW MARCELLUS H  
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 STUART G W  
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 STUDIER M H  
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 SUBRAMANIAN N R  
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 SUE PIERRE  
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 SUECHTING RALPH L  
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 SUNDKVIST GUSTAV  
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 SURAK JOHN G  
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 SWIATECKI W J  
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 TAKESHITA KENJI  
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 TAYLOR J H  
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WINN ROBERT A  
10-1369  
WINOGRADSKI A  
10-1647  
WINTER F R  
10-2089  
WINTER ROLF G  
10-455  
WINTERSTEEN C R  
10-1217  
WINTHER AAGE  
10-1541  
WINZELER M  
10-1887 10-1894
- WISEMAN C D  
10-846  
WISNIEWSKI F J  
10-369  
WITSCHI EMIL  
10-2606  
WITTWER S H  
10-50  
WITZIG W F  
10-2194  
WITZIG WARREN F  
10-2918  
WOJDOWSKY LEONARD  
10-552  
WOLF ALFRED P  
10-1253 10-1758  
WOLFE DOLORES E  
10-545  
WOLFE HARRY B  
10-2133  
WOLFE RAY  
10-3772  
WOLFENDALE A W  
10-1482  
WOLFGANG RICHARD L  
10-2652  
WOLFSBERG MAX  
10-2653  
WOLFSON J L  
10-339 10-1949  
WOLICK E A  
10-357  
WOLICKI E A  
10-2149  
WOLLAN E O  
10-320 10-3144  
WOLTERINK L F  
10-1205 10-1206 10-2007  
WONG ROBERT  
10-2012  
WOOD D S  
10-178 10-1813  
WOOD DAVID A  
10-16  
WOOD LAURIER A  
10-3838  
WOOD R E  
10-2843  
WOODARD R W  
10-2268 10-3536 10-3567  
10-3569 10-3571  
WOODBERRY P  
10-2255  
WOODFORD HUGH J  
10-1455  
WOODLEY R E  
10-2977  
WOODROW J  
10-126  
WOODS D  
10-3889  
WOOLLETT A H  
10-1264  
WOOLLEY H W  
10-3584  
WORK J B  
10-3594  
WOUTERS L F  
10-1678  
WOUTERS LOUIS F  
10-1872  
WRIGHT B T  
10-3069  
WRIGHT BYRON T  
10-1587 10-3240  
WRIGHT G T  
10-267  
WRIGHT J H  
10-645  
WRIGHT J R  
10-651  
WRIGHT R E  
10-1671  
WRIGHT S C  
10-966  
WRIGHT W B JR  
10-616 10-3349  
WRIGHT WILLIAM B JR  
10-2046  
WROTEN W L  
10-1346  
WU C S  
10-358  
WU CHIEN-SHIUNG  
10-391  
WULFF I  
10-1285  
WURGER E  
10-1976  
WURM MAX  
10-3829  
WYATT E I  
10-3266  
WYLD H W  
10-2137  
WYLD H W JR  
10-1483  
WYMAN L L  
10-2236 10-3332
- YAFFE L  
10-977  
YAGGEE FRANK L  
10-2428  
YAGODA HERMAN  
10-2760  
YALOW ROSALYN S  
10-2607  
YAMAMURA STANLEY S  
10-80  
YAMANE KOSHIN  
10-597  
YAMASAKI KAZNO  
10-2668  
YAMAUCHI H  
10-1497  
YAMPOLSKII P A  
10-473  
YANNAQUIS NICOLAS  
10-3191  
YARGER F L  
10-228 10-993  
YARGER FREDERICK L  
10-1445  
YAVIN AVIVI I  
10-352  
YAVOR S YA  
10-1131  
YEAGER J HAROLD  
10-3417 10-3513 10-3564  
YEIVIN Y  
10-939  
YENICAY F  
10-2126  
YERKOVICH L A  
10-142  
YETTER L R  
10-1454 10-3293  
YOCKEY H P  
10-1667  
YOKUTIELI G  
10-2914  
YOSHIDA SHIRO  
10-1902  
YOST G F  
10-2614  
YOUNG C W  
10-3415  
YOUNG G  
10-3636 10-3661 10-3710  
10-3726 10-3728  
YOUNG H A  
10-1317  
YOUNG J D  
10-1569  
YOUNG J R  
10-1098  
YOUNG WEI  
10-3  
YOUTZ M A  
10-1209  
YPSILANTIS THOMAS  
10-1510  
YUNKER J E  
10-1058  
YUSKEVICH A A  
10-1401
- ZABALA I  
10-1018  
ZABOZLAIEVA E A  
10-2581  
ZACCHERONI E  
10-233  
ZACHARIASEN FREDRIK  
10-1085  
ZACHARIASEN W H  
10-741 10-2034 10-2456  
ZACUTTI A  
10-960  
ZAEV N E  
10-626  
ZAFFARANO D J  
10-2180  
ZAGORETS P A  
10-1128  
ZAIDEL A N  
10-1618  
ZALKIN A  
10-3137  
ZALKIN ALLAN  
10-910  
ZAMBROW J L  
10-1803  
ZAPP K H  
10-659  
ZAPPA L  
10-447 10-2852 10-2932  
ZASLAVSKII YU S  
10-2041  
ZATSEPIN G T  
10-2761  
ZAUBERIS D D  
10-3020  
ZAVATTINI E  
10-212  
ZAVYALOV YU S  
10-773



ZEGLER S T  
 10-777  
 ZEITLIN H R  
 10-3248  
 ZELDES HENRY  
 10-1519 10-2218  
 ZELDOVICH YA B  
 10-2809 10-3247  
 ZELENKOVA T E  
 10-1311  
 ZEMACH A C  
 10-368  
 ZEMEK F  
 10-3778  
 ZENGER JERRY  
 10-2173  
 ZHABOTINSKI M E  
 10-930  
 ZHARKOV V N  
 10-1413  
 ZHDANOV V A  
 10-1432  
 ZHIROV K K  
 10-3131  
 ZHUKOV A M  
 10-870  
 ZHUKOVA N V  
 10-970  
 ZHUKOVSKII N N  
 10-466 10-467 10-469  
 ZICHICHI A  
 10-212  
 ZICKEL J  
 10-388  
 ZIJP W L  
 10-1114  
 ZILLOTTO DONATO  
 10-1183 10-1473  
 ZILVERSMIT D B  
 10-83  
 ZIMELEV A G  
 10-226  
 ZIMIN A  
 10-2188 10-3242  
 ZIMMER E  
 10-447  
 ZIMMER E L  
 10-1771  
 ZIMMERMAN D L  
 10-2432  
 ZINGARO RALPH A  
 10-2678  
 ZINN A  
 10-238  
 ZINN W H  
 10-1675 10-1683  
 ZINOVEVA K N  
 10-309  
 ZIPP ROBERT E  
 10-2578  
 ZISHAN W A  
 10-2644  
 ZIMBORY L  
 10-875  
 ZORIN Z M  
 10-2040  
 ZUBER N  
 10-2698  
 ZUCKER A  
 10-403  
 ZVEREV G L  
 10-657  
 ZWEIFEL P F  
 10-243 10-3220  
 ZWICK S A  
 10-760  
 ZYKOV D D  
 10-770  
 ZYKOV S I  
 10-2068  
 ZYRYANOV P S  
 10-914  
 ZYZES F C  
 10-2058

## CORPORATE AUTHOR INDEX

For each reference the digit preceding the dash is the volume number and digits after the dash are the abstract number.

AEROJET GENERAL CORP.,  
 AZUSA, CALIF.  
 10-54 10-560 10-2670  
 AIR MATERIEL COMMAND,  
 WRIGHT-PATTERSON AIR FORCE  
 BASE, OHIO.  
 10-1374 10-1375 10-1376  
 10-1377 10-1378  
 AKTIEBOLAGET ATOMENERGI,  
 STOCKHOLM.  
 10-1059  
 ALCO PRODUCTS, INC.,  
 SCHENECTADY, N. Y.  
 10-1563  
 ALLEGHENY LUDLUM STEEL CORP.,  
 RESEARCH LAB., WATERVLIET,  
 N. Y.  
 10-826 10-1397  
 ALLIS-CHALMERS MFG. CO.,  
 MILWAUKEE.  
 10-783  
 ALUMINUM CO. OF AMERICA.  
 ALUMINUM RESEARCH LABS.,  
 NEW KENSINGTON, PENNA.  
 10-2075  
 AMERICAN CYANAMID CO. ATOMIC  
 ENERGY DIV. RAW MAT. DEV.  
 LAB., WINCHESTER MASS.  
 10-642 10-643 10-644  
 10-645 10-646 10-647  
 10-742 10-1284 10-2043  
 10-2658 10-2659 10-2660  
 10-2661 10-2677 10-2678  
 10-2982 10-2983 10-2984  
 10-2985 10-2986 10-2987  
 10-2998 10-3117 10-3119  
 10-3347  
 AMERICAN CYANAMID CO. ATOMIC  
 ENERGY DIV., WATERTOWN,  
 MASS.  
 10-660 10-661 10-2980  
 10-2981 10-3111  
 AMERICAN ELECTRO METAL  
 CORP., YONKERS, N. Y.  
 10-559 10-784 10-1391  
 10-1392  
 AMERICAN TURBINE CORP.,  
 YONKERS, N. Y.  
 10-1150  
 ANES LAB., ANES, IOWA.  
 10-62 10-79 10-80  
 10-109 10-331 10-568  
 10-569 10-570 10-571  
 10-609 10-634 10-718  
 10-840 10-1236 10-1518  
 10-1755 10-1774 10-2045  
 10-2180 10-2303 10-2378  
 10-2379 10-2719 10-2720  
 10-2989 10-2990 10-3011  
 10-3022 10-3048 10-3102  
 10-3108 10-3196 10-3197  
 10-3335 10-3367 10-3427  
 10-3429 10-3431 10-3484  
 10-3485 10-3510 10-3559  
 10-3598 10-3761 10-3788  
 10-3826 10-3887  
 ARCOS CORP., PHILADELPHIA.  
 10-147  
 ARGONNE CANCER RESEARCH  
 HOSPITAL, CHICAGO.  
 10-3167  
 ARGONNE NATIONAL LAB.,  
 LEMONT, ILL.  
 10-330 10-374 10-606  
 10-777 10-1008 10-1029  
 10-1161 10-1364 10-1365  
 10-1636 10-1637 10-1806  
 10-1837 10-1921 10-1928  
 10-1992 10-2042 10-2070  
 10-2256 10-2283 10-2428  
 10-2496 10-2509 10-2510  
 10-2511 10-2512 10-2554  
 10-2567 10-2648 10-2748  
 10-3020 10-3024 10-3028  
 10-3110 10-3193 10-3226  
 10-3289 10-3321 10-3323  
 10-3327 10-3330 10-3338  
 10-3339 10-3352 10-3355  
 10-3357 10-3365 10-3380  
 10-3384 10-3408 10-3432  
 10-3499 10-3547 10-3591  
 10-3644 10-3649 10-3650  
 10-3651 10-3652 10-3653  
 10-3654 10-3655 10-3656  
 10-3657 10-3677 10-3678  
 10-3745 10-3784 10-3800  
 10-3861 10-3862 10-3884  
 ARKANSAS, UNIV.,  
 FAYETTEVILLE.  
 10-1211  
 ARKANSAS, UNIV., FAYETTE-  
 VILLE, COLL. OF ARTS AND  
 SCIENCES.  
 10-3295  
 ARMED SERVICES TECH. INFO.  
 AGENCY REF. CENTER, LIB. OF  
 CONGRESS, WASH., D. C.  
 10-785  
 ARMY MEDICAL RESEARCH LAB.,  
 FORT KNOX, KY.  
 10-41  
 ATOMIC ENERGY COMMISSION,  
 WASHINGTON, D. C.  
 10-535  
 ATOMIC ENERGY OF CANADA LTD.,  
 CHALK RIVER PROJECT, CHALK  
 RIVER, ONT.  
 10-106 10-202 10-373  
 10-504 10-505 10-628  
 10-1411 10-1551 10-1923  
 10-1977 10-2164 10-2882  
 10-2885 10-2897  
 ATOMICS INTERNATIONAL DIV.,  
 N. AMERICAN AVIATION, INC.,  
 CANOGA PARK, CALIF.  
 10-3307 10-3316 10-3322  
 10-3333  
 AVCO MFG. CORP., STRATFORD,  
 CONN.  
 10-1393  
 BABCOCK AND WILCOX CO.,  
 RESEARCH CENTER, ALLIANCE,  
 OHIO.  
 10-1886  
 BARTOL RESEARCH FOUNDATION,  
 PHILADELPHIA.  
 10-3034  
 BATTELLE MEMORIAL INST.,  
 COLUMBUS, OHIO.  
 10-55 10-176 10-613  
 10-669 10-670 10-671  
 10-672 10-673 10-674  
 10-675 10-825 10-831  
 10-832 10-833 10-834  
 10-844 10-856 10-857  
 10-866 10-887 10-1143  
 10-1202 10-1209 10-1268  
 10-1367 10-1368 10-1369  
 10-1394 10-2022 10-2052  
 10-2056 10-2057 10-2071  
 10-2072 10-2080 10-2284  
 10-2377 10-2437 10-2438  
 10-2439 10-2680 10-2681  
 10-2702 10-2703 10-2714  
 10-2715 10-2716 10-2999  
 10-3000 10-3005 10-3006  
 10-3009 10-3010 10-3121  
 10-3161 10-3194 10-3195  
 10-3336 10-3356 10-3358  
 10-3359 10-3364 10-3385  
 10-3407 10-3609 10-3785  
 10-3787 10-3807 10-3809  
 10-3810 10-3811 10-3812  
 10-3813 10-3814 10-3815  
 10-3816 10-3885  
 BATTELLE MEMORIAL INST.,  
 TITANIUM METALLURGICAL  
 LAB., COLUMBUS, OHIO.  
 10-189 10-1374 10-1375  
 10-1376 10-1377 10-1378  
 10-1387 10-1388 10-1389  
 10-1818 10-1819 10-1820  
 10-2728 10-2729  
 BAUSCH AND LOMB OPTICAL CO.,  
 ROCHESTER, N. Y.  
 10-3845  
 BELL AIRCRAFT CORP.,  
 BUFFALO.  
 10-127  
 BRIDGEPORT BRASS CO., CONN.  
 10-2436 10-3013 10-3362  
 BRIGHAM YOUNG UNIV., PROVO,  
 UTAH.  
 10-1455  
 BRITISH INTELLIGENCE  
 OBJECTIVES SUB-COMMITTEE.  
 10-145  
 BROOKHAVEN NATIONAL LAB.,  
 UPTON, N. Y.  
 10-1 10-644 10-948  
 10-1000 10-1030 10-1463  
 10-1548 10-1549 10-1550  
 10-2053 10-2054 10-2252  
 10-2306 10-2307 10-2308  
 10-2327 10-2328 10-2440  
 10-2489 10-2513 10-2514  
 10-2515 10-2516 10-2517  
 10-2518 10-2519 10-2520  
 10-2521 10-2552 10-2557  
 10-2562 10-2886 10-3033  
 10-3037 10-3038 10-3039  
 10-3042 10-3093 10-3095  
 10-3143 10-3145 10-3146  
 10-3194 10-3213 10-3221  
 10-3220 10-3229 10-3231  
 10-3232 10-3233 10-3234  
 10-3251 10-3511 10-3519  
 10-3345 10-3373 10-3378  
 10-3386 10-3387 10-3388  
 10-3389 10-3390 10-3391  
 10-3392 10-3393 10-3394  
 10-3395 10-3396 10-3397  
 10-3398 10-3399 10-3400  
 10-3406 10-3469 10-3679  
 10-3731 10-3743 10-3863  
 10-3864 10-3865 10-3866  
 10-3867 10-3868 10-3869  
 10-3879 10-3886  
 BROOKLYN, POLYTECHNIC INST.  
 10-185 10-186  
 BROWN UNIV., PROVIDENCE.  
 10-1508 10-1752 10-2360  
 10-3250  
 BROWN UNIV., PROVIDENCE.  
 METCALF RESEARCH LAB.  
 10-2564 10-2365 10-3528  
 BUREAU OF MINES.  
 10-175 10-607 10-804  
 10-805 10-1357 10-1616  
 10-1807 10-1808 10-3262  
 10-3284  
 BUREAU OF MINES, ELECTRO-  
 TECHNICAL LAB., NORRIS,  
 TENN.  
 10-2408 10-2409 10-2410  
 10-2411 10-2412 10-2413  
 10-2414 10-2415 10-2416  
 10-2417 10-2418 10-2419  
 10-2420 10-2421 10-2422  
 10-2423 10-2424 10-2425  
 10-2426 10-2427  
 BUREAU OF MINES, EXPLOSIVES  
 AND PHYSICAL SCIENCES DIV.,  
 PITTSBURGH.  
 10-563  
 BUREAU OF MINES, NORTHWEST  
 ELECTRO-DEVELOPMENT LAB.,  
 ALBANY, OREG.  
 10-858 10-859  
 BUREAU OF MINES, PACIFIC  
 EXPERIMENT STATION,  
 BERKELEY, CALIF.  
 10-2448  
 CALIFORNIA INST. OF TECH.,  
 AZUSA, HYDRODYNAMICS LAB.  
 10-760  
 CALIFORNIA INST. OF TECH.,  
 PASADENA.  
 10-1813  
 CALIFORNIA INST. OF TECH.,  
 PASADENA, DYNAMIC  
 PROPERTIES LAB.  
 10-178  
 CALIFORNIA INST. OF TECH.,  
 PASADENA, GUGGENHEIM  
 AERONAUTICAL LAB.  
 10-2693  
 CALIFORNIA INST. OF TECH.,  
 PASADENA, JET PROPULSION  
 LAB.  
 10-572  
 CALIFORNIA INST. OF TECH.,  
 PASADENA, NORMAN BRIDGE  
 LAB. OF PHYSICS.  
 10-3291 10-3290 10-3851

- CALIFORNIA RESEARCH AND DEV. CO., LIVERMORE, CALIF.  
10-841 10-3129 10-3589  
10-3604 10-3605 10-3642  
10-3643 10-3660 10-3733  
10-3734
- CALIFORNIA RESEARCH AND DEV. CO., LIVERMORE RESEARCH LAB., LIVERMORE, CALIF.  
10-912 10-1332 10-1938  
10-2059 10-2074 10-2237  
10-2459 10-2469 10-2679  
10-2965
- CALIFORNIA RESEARCH CORP., RICHMOND, CALIF.  
10-3858
- CALIFORNIA UNIV., BERKELEY. INST. OF ENGINEERING RESEARCH.  
10-846
- CALIFORNIA UNIV., BERKELEY. RADIATION LAB.  
10-3 10-222 10-490  
10-582 10-583 10-629  
10-726 10-744 10-787  
10-909 10-919 10-926  
10-927 10-938 10-979  
10-1009 10-1081 10-1082  
10-1090 10-1129 10-1130  
10-1154 10-1217 10-1218  
10-1267 10-1438 10-1447  
10-1448 10-1467 10-1468  
10-1584 10-1566 10-1587  
10-1694 10-1696 10-1729  
10-1859 10-1863 10-1897  
10-1939 10-1948 10-2079  
10-2103 10-2181 10-2226  
10-2241 10-2332 10-2333  
10-2334 10-2343 10-2344  
10-2345 10-2353 10-2354  
10-2393 10-2394 10-2393  
10-2451 10-2452 10-2453  
10-2454 10-2458 10-2461  
10-2463 10-2466 10-2468  
10-2488 10-2493 10-2498  
10-2499 10-2500 10-2501  
10-2502 10-2503 10-2547  
10-2551 10-2571 10-2572  
10-2628 10-2639 10-3031  
10-3045 10-3046 10-3047  
10-3098 10-3104 10-3116  
10-3164 10-3165 10-3204  
10-3205 10-3206 10-3207  
10-3215 10-3216 10-3222  
10-3239 10-3240 10-3241  
10-3246 10-3272 10-3303  
10-3304 10-3305 10-3308  
10-3320 10-3495 10-3496  
10-3500 10-3501 10-3503  
10-3565 10-3566 10-3620  
10-3624 10-3640 10-3662  
10-3663 10-3664 10-3735  
10-3750 10-3755 10-3772  
10-3791 10-3792 10-3844  
10-3847 10-3848 10-3854  
10-3878
- CALIFORNIA UNIV., BERKELEY. SANITARY ENGINEERING RESEARCH LAB.  
10-1327
- CALIFORNIA UNIV., LIVERMORE. RADIATION LAB.  
10-236 10-382 10-893  
10-910 10-928 10-943  
10-1412 10-1853 10-1872  
10-2173 10-3137 10-3221  
10-3225 10-3236 10-3287
- CALIFORNIA UNIV., LOS ANGELES.  
10-573 10-574 10-778  
10-3044 10-3202
- CALIFORNIA UNIV., LOS ANGELES. ATOMIC ENERGY PROJECT  
10-2 10-507 10-508  
10-509 10-517 10-554  
10-555 10-581 10-956  
10-2671 10-2967 10-2973  
10-2993 10-3184 10-3328  
10-3351 10-3770 10-3776  
10-3834 10-3881
- CALIFORNIA UNIV., LOS ANGELES. SCHOOL OF MEDICINE.  
10-956 10-1153 10-1329  
10-1693
- CALIFORNIA UNIV., SAN FRANCISCO. SCHOOL OF MEDICINE. RADIOLOGICAL LAB  
10-3146
- CALLERY CHEMICAL CO., PENNA.  
10-60 10-232 10-1210  
10-1211 10-1212 10-2611  
10-2612
- CANADA. DEPT. OF MINES AND TECHNICAL SURVEYS. MINES BRANCH.  
10-795 10-1465
- CARBIDE AND CARBON CHEMICALS CORP., K-25 PLANT, OAK RIDGE, TENN.  
10-242 10-1213 10-1490  
10-1703 10-1994 10-2103  
10-2340 10-2401 10-2404  
10-2484 10-2682 10-2975  
10-3129 10-3181 10-3346  
10-3411 10-3442 10-3443  
10-3464 10-3476 10-3491  
10-3497 10-3554 10-3555  
10-3556 10-3557 10-3577  
10-3578 10-3579 10-3586  
10-3597 10-3638 10-3639  
10-3763 10-3796
- CARBIDE AND CARBON CHEMICALS CORP., OAK RIDGE, TENN.  
10-2046
- CARBIDE AND CARBON CHEMICALS CORP., SUBSTITUTE ALLOY MATERIALS LABS., N. Y.  
10-2370 10-2371
- CARBIDE AND CARBON CHEMICALS CORP., Y-12 PLANT, OAK RIDGE, TENN.  
10-615 10-2267 10-2268  
10-2276 10-2395 10-2336  
10-2337 10-2455 10-2460  
10-2470 10-2473 10-2474  
10-2475 10-2477 10-2478  
10-2479 10-2570 10-2736  
10-2994 10-2995 10-2996  
10-3016 10-3135 10-3182  
10-3200 10-3459 10-3460  
10-3461 10-3473 10-3532  
10-3533 10-3567 10-3568  
10-3569 10-3570 10-3571  
10-3572 10-3573 10-3574  
10-3575 10-3576 10-3580  
10-3600 10-3625 10-3626  
10-3627 10-3628 10-3629  
10-3630 10-3631 10-3632  
10-3633 10-3665 10-3737  
10-3753 10-3793 10-3820
- CARNEGIE INST. OF TECH., PITTSBURGH.  
10-1395 10-1601 10-1814  
10-1840 10-1944 10-2076  
10-3415 10-3470
- CARNEGIE INST. OF TECH., PITTSBURGH. METALS RESEARCH LAB.  
10-2988
- CASE INST. OF TECH., CLEVELAND.  
10-1373 10-1396 10-1805  
10-1821 10-2078 10-2723  
10-3153 10-3280 10-3281
- CASE INST. OF TECH., CLEVELAND. NUCLEAR PHYSICS LAB.  
10-2964
- CATALYTIC CONSTRUCTION CO., PHILADELPHIA.  
10-3000
- CHEMICAL CORPS MEDICAL LABS., ARMY CHEMICAL CENTER, MD.  
10-547
- CHEMICAL CORPS SCHOOL, ARMY CHEMICAL CENTER, MD.  
10-954
- CHICAGO. UNIV. AIR FORCE RADIATION LAB.  
10-536
- CHICAGO. UNIV. METALLURGICAL LAB.  
10-2346 10-2441 10-2456  
10-2464 10-2486 10-2487  
10-2522 10-2548 10-2563  
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10-3416 10-3428 10-3430  
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10-3712 10-3713 10-3714  
10-3746 10-3748 10-3758  
10-3759 10-3760
- CINCINNATI UNIV.  
10-780
- CLIMAX MOLYBDENUM CO. OF MICH., DETROIT.  
10-827 10-843 10-865  
10-2083
- CLINTON LABS., OAK RIDGE, TENN.  
10-1286 10-2244 10-2285  
10-2331 10-2541 10-2543  
10-2972 10-3230 10-3434  
10-3443 10-3585 10-3641  
10-3659 10-3661 10-3673  
10-3686 10-3726 10-3727  
10-3728 10-3732 10-3740  
10-3873
- CLINTON NATIONAL LAB., OAK RIDGE, TENN.  
10-2360 10-2490 10-3490
- COLUMBIA UNIV., IRVINGTON-ON-HUDSON, N. Y. NEVIS CYCLOTRON LABS.  
10-3032
- COLUMBIA UNIV., NEW YORK.  
10-150 10-515 10-1358  
10-1785 10-2356 10-2363  
10-3187 10-3354 10-3601  
10-3668 10-3669 10-3670  
10-3757
- COLUMBIA UNIV., NEW YORK. DIV. OF WAR RESEARCH.  
10-2249 10-2342 10-2358  
10-2359 10-2362 10-2471  
10-3420 10-3421 10-3462  
10-3498 10-3516
- COLUMBIA UNIV., NEW YORK. MINERAL BENEFICIATION LAB.  
10-1900 10-1301
- COLUMBIA UNIV., NEW YORK. NUCLEAR PHYSICS LABS.  
10-3852
- COLUMBIA UNIV., NEW YORK. RADIOLOGICAL RESEARCH LAB.  
10-516
- COLUMBIA UNIV., NEW YORK. SCHOOL OF MINES.  
10-578 10-867
- CONNECTICUT UNIV., STORRS.  
10-131 10-762 10-3159
- CONSOLIDATED VULTEE AIRCRAFT CORP., FORT WORTH, TEX.  
10-950 10-951 10-1101  
10-1464 10-1858
- CONSULTING LAB., SCHENECTADY, N. Y.  
10-3621
- CONVAIR, FORT WORTH, TEX.  
10-2895
- CORNELL AERONAUTICAL LAB., INC., BUFFALO.  
10-142 10-835 10-852  
10-1116 10-1117 10-1216
- CORNELL UNIV., ITHACA, N. Y.  
10-3270
- DELAWARE UNIV., NEWARK.  
10-1724
- DENVER UNIV., DENVER RESEARCH INST.  
10-1333
- DETROIT CONTROLS CORP., REDWOOD CITY, CALIF.  
10-1859
- DETROIT UNIV.  
10-221
- DIVISION OF BIOLOGY AND MEDICINE. RADIATION INSTRUMENTS BRANCH, AEC.  
10-2467
- DIVISION OF ENGINEERING, AEC.  
10-705
- DIVISION OF RAW MATERIALS, AEC.  
10-148 10-1784
- DIVISION OF RAW MATERIALS. DENVER EXPLORATION BRANCH, AEC.  
10-801 10-1352
- DIVISION OF RAW MATERIALS. SALT LAKE EXPLORATION BRANCH, AEC.  
10-802 10-803 10-1353  
10-1354 10-1355
- DIVISION OF REACTOR DEVELOPMENT, AEC.  
10-1963 10-2163 10-2610
- DIVISION OF REACTOR DEVELOPMENT. NAVAL REACTORS BRANCH, AEC.  
10-1868 10-3318
- DIVISION OF SOURCE AND SPECIAL NUCLEAR MATERIALS ACCOUNTABILITY, AEC.  
10-3029
- DOW CHEMICAL CO. GREAT WESTERN DIV., PITTSBURG, CALIF.  
10-702 10-703
- DOW CHEMICAL CO. ROCKY FLATS PLANT, DENVER.  
10-1740
- DOW CHEMICAL CO. WESTERN DIV., PITTSBURG, CALIF.  
10-566 10-676 10-677  
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10-713 10-714 10-715
- 10-716 10-717 10-745  
10-1287 10-1289 10-2044  
10-2662 10-2749 10-3112  
10-3122 10-3180
- DOM CORNING CORP., MIDLAND, MICH.  
10-2020
- DRIVER HARRIS CO., HARRISON, N. J.  
10-1379
- DUKE UNIV., DURHAM, N. C.  
10-580
- DUMONT, ALLEN B. LABS. INC., TUBE RESEARCH LABS., PASSAIC, N. J.  
10-3021
- DU PONT DE NEMOURS E. I. AND CO. ENGINEERING DEPT., WILMINGTON, DEL.  
10-3468 10-3524
- DU PONT DE NEMOURS E. I. & CO. EXPERIMENTAL STATION, WILMINGTON, DEL.  
10-2704
- DU PONT DE NEMOURS E. I. AND CO. JACKSON LAB., WILMINGTON, DEL.  
10-2309 10-2311 10-2312  
10-2313 10-2325 10-2361  
10-2423 10-3465 10-3466  
10-3511 10-3514 10-3520  
10-3521 10-3522 10-3560
- DU PONT DE NEMOURS E. I. & CO. PIGMENTS DEPT., WILMINGTON, DEL.  
10-2250 10-2251
- DU PONT DE NEMOURS E. I. & CO. SAVANNAH RIVER LAB., AUGUSTA, GA.  
10-1235 10-2536 10-3142  
10-3331 10-3377 10-3435  
10-3436
- DU PONT DE NEMOURS E. I. AND CO. TXN DIV., WILMINGTON, DEL.  
10-3038
- DU PONT DE NEMOURS E. I. AND CO., WILMINGTON, DEL.  
10-3447 10-3523 10-3752
- DUCQUESNE UNIV., PITTSBURGH.  
10-1212
- ENGINEER RESEARCH AND DEVELOPMENT LABS., FORT BELVOIR, VA.  
10-1563
- EUROPEAN COUNCIL FOR NUCLEAR RESEARCH, GENEVA.  
10-1458
- EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH, GENEVA.  
10-201 10-233 10-407  
10-408 10-409 10-922  
10-1219
- EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH, GENEVA. PROTON SYNCHROTRON GP.  
10-1076 10-1077 10-1078  
10-1935
- EVANS SIGNAL LAB., BELMAR, N. J.  
10-953
- FOOTE MINERAL CO., PHILADELPHIA.  
10-1215
- FRANKLIN INST. LABS. FOR RESEARCH AND DEVELOPMENT, PHILADELPHIA.  
10-925 10-1386 10-3188  
10-3199 10-3369
- GENERAL CABLE CORP., BAYONNE, N. J.  
10-3562
- GENERAL ELECTRIC CO. AIRCRAFT NUCLEAR PROPULSION DEPT., CINCINNATI.  
10-1993 10-3004 10-3838
- GENERAL ELECTRIC CO. ATOMIC PRODUCTS DIV., SCHENECTADY, N. Y.  
10-2717
- GENERAL ELECTRIC CO. GENERAL ENGINEERING LAB., SCHENECTADY, N. Y.  
10-2400 10-2405 10-3621
- GENERAL ELECTRIC CO. RESEARCH LAB., SCHENECTADY, N. Y.  
10-188 10-192 10-853  
10-896 10-2733 10-3194  
10-3286 10-3821
- GENERAL ELECTRIC CO., SCHENECTADY, N. Y.  
10-2403 10-2462 10-2507



GENERAL ELECTRIC CO., TRANS- FORMER AND ALLIED PRODUCTS DIV., PITTSFIELD, MASS. 10-756	ILLINOIS INST. OF TECH., CHICAGO. 10-2782	10-2295 10-2296 10-2297	MICHIGAN UNIV., ANN ARBOR. ENGINEERING RESEARCH INST. 10-14 10-124 10-484 10-512 10-1162 10-2025 10-2613
GENERAL SERVICES ADMINISTRATION, WASHINGTON, D. C. 10-758	ILLINOIS INST. OF TECH., CHICAGO. ARMOUR RESEARCH FOUNDATION. 10-180 10-190 10-861 10-1242 10-1370 10-1381 10-3014	10-2301 10-2302 10-2348 10-2349 10-2350 10-2351 10-2352 10-2385 10-2386 10-2387 10-2388 10-2389 10-2390 10-2391 10-2443 10-2444 10-2472 10-2491 10-2504 10-2505 10-2506 10-2540 10-2550 10-2568 10-2569 10-2615 10-3155 10-3160 10-3505 10-3506 10-3507 10-3610 10-3648 10-3667 10-3724 10-3749 10-3764 10-3201 10-3267 10-3775 10-3795 10-3801 10-3824	MIDWEST RESEARCH INST., KANSAS CITY, MO. 10-203 MINE SAFETY APPLIANCES CO., CALLERY, PENNA. 10-120 10-576 10-847 10-1775 10-2789 MINNESOTA MINING AND MFG. CO., ST. PAUL. 10-1750 MINNESOTA UNIV., MINNEAPOLIS. 10-2732 10-2757 10-2758 10-3130 MINNESOTA UNIV., MINNEAPOLIS. UNIVERSITY HOSPITAL. 10-2005 MONSANTO CHEMICAL CO., DAYTON, OHIO. 10-3412 10-3671 MOUND LAB., MIAMISBURG, OHIO. 10-11 10-12 10-13 10-116 10-546 10-645 10-668 10-1427 10-1428 10-1429 10-1430 10-1839 10-2112 10-2195 10-2278 10-2485 10-2578 10-2684 10-2727 10-2966 10-2979 10-3126 10-3163 10-3252 10-3300 10-3375 10-3378 10-3617 10-3622 10-3777 10-3789 10-3844
GEORGE WASHINGTON UNIV., WASHINGTON, D. C. 10-3271	INDIANA UNIV., BLOOMINGTON. 10-3736 INTERNATIONAL MINERALS AND CHEMICAL CORP., CHICAGO. 10-65 10-1294 10-1295 10-1296 10-1297 10-3113 IOWA STATE COLL., AMES. 10-575 10-3508 10-3509 10-3741 IOWA STATE COLL., AMES. INST. FOR ATOMIC RESEARCH. 10-822 IOWA STATE COLL., STATISTICAL LAB. 10-1356	MADISON SQUARE AREA, MANHATTAN DISTRICT, NEW YORK. 10-2272 10-3419 10-3751 MALLINCKRODT CHEMICAL WORKS, ST. LOUIS. 10-636 10-719 10-747 10-748 10-924 10-1146 10-1290 10-1315 10-1765 10-3413 10-3417 10-3426 10-3445 10-3446 10-3447 10-3448 10-3449 10-3450 10-3451 10-3452 10-3453 10-3454 10-3455 10-3456 10-3457 10-3458 10-3513 10-3515 10-3561 10-3562 10-3564 10-3599 10-3612 10-3765	NATIONAL BUREAU OF STDs. WASHINGTON, D. C. 10-63 10-174 10-488 10-604 10-640 10-862 10-952 10-1726 10-2261 10-2304 10-2355 10-2357 10-2369 10-2566 10-2787 10-2976 10-2978 10-3136 10-3185 10-3217 10-3361 10-3422 10-3463 10-3494 10-3584 10-3603 NATIONAL LEAD CO., INC. RAW MATERIALS DEVELOPMENT LAB., WINCHESTER, MASS. 10-66 10-67 10-587 10-727 10-728 10-1302 10-1303 10-1322 10-1323 10-3273 10-3344 10-3790 10-3799 NATIONAL LEAD CO. OF OHIO, CINCINNATI. 10-1188 10-2457 10-3120 10-3175 10-3806 10-3833 NATIONAL RESEARCH CORP., CAMBRIDGE, MASS. 10-824 NATIONAL RESEARCH COUNCIL. COMMITTEE ON TABLES OF CON- STANTS & NUMERICAL DATA. 10-1520 NATIONAL RESEARCH COUNCIL. MATERIALS ADVISORY BOARD. 10-177 NAVAL BOILER AND TURBINE LAB., PHILADELPHIA. 10-842 NAVAL ENGINEERING EXPERIMENT STATION. METALLURGICAL LAB., ANNAPOLIS. 10-1809 NAVAL MEDICAL RESEARCH INST., BETHESDA, MD. 10-16 10-514 10-1164 10-1165 NAVAL ORDNANCE LAB., CORONA, CALIF. 10-2751 10-2752 10-2708 NAVAL RADIOLOGICAL DEFENSE LAB., SAN FRANCISCO. 10-16 10-21 10-22 10-503 10-518 10-537 10-779 10-1097 10-1189 10-1241 10-1697 10-1846 10-2817 NAVAL RESEARCH LAB., WASHINGTON, D. C. 10-182 10-577 10-586 10-849 10-850 10-891 10-1080 10-1088 10-1382 10-1507 10-1704 10-1871 10-2146 10-2172 10-2592 10-2627 10-2644 10-2725 10-2815 10-2858 NEW BRUNSWICK LAB., AEC, N. J. 10-81
GOODRICH B. F. CO., RESEARCH CENTER, BRECKSVILLE, OHIO. 10-64 GRAND JUNCTION OPERATIONS OFFICE, AEC., COLO. 10-796 10-797 10-798 10-799 10-800 10-806 10-1350 10-1351 10-2063 GT. BRIT. ADMIRALTY RESEARCH LAB., TEDDINGTON, ENGLAND. 10-1838 GT. BRIT. ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL, BERKS, ENGLAND 10-126 10-248 10-249 10-250 10-605 10-761 10-776 10-830 10-921 10-923 10-946 10-947 10-1029 10-1031 10-1074 10-1075 10-1086 10-1232 10-1253 10-1256 10-1271 10-1547 10-1582 10-1583 10-2051 10-2187 10-2643 10-2650 10-2699 10-2903 10-2904 10-2926	JOINT ESTABLISHMENT FOR NUCLEAR ENERGY RESEARCH, KJELLER, NORWAY. 10-1319 10-2167 KANSAS UNIV., LAWRENCE. 10-2574 10-2575 10-2576 KELLEX CORP., NEW YORK. 10-2253 10-2273 10-2274 10-2275 10-2279 10-2462 10-3424 10-3477 10-3525 10-3558 10-3559 10-3588 KENTUCKY UNIV., LEXINGTON. KENTUCKY RESEARCH FOUNDATION. 10-823 KERITE CO., NEW YORK. 10-3583 KNOLLS ATOMIC POWER LAB., SCHENECTADY, N. Y. 10-117 10-119 10-173 10-243 10-743 10-888 10-941 10-1001 10-1002 10-1028 10-1056 10-1057 10-1058 10-1231 10-1237 10-1238 10-1336 10-1337 10-1372 10-1454 10-1556 10-1599 10-1639 10-1738 10-1772 10-1849 10-1926 10-1975 10-2058 10-2073 10-2092 10-2236 10-2254 10-2277 10-2375 10-2384 10-2402 10-2434 10-2494 10-2495 10-2663 10-2683 10-2804 10-2883 10-3103 10-3174 10-3198 10-3220 10-3244 10-3293 10-3299 10-3332 10-3340 10-3404 10-3444 10-3472 10-3478 10-3587 10-3718 10-3719 10-3720 10-3721 10-3722 10-3723 10-3779 10-3804 10-3843 10-3857 10-3872 10-3888 LANGLEY AERONAUTICAL LAB., LANGLEY FIELD, VA. 10-2721 10-2722 LEHIGH UNIV., BETHLEHEM, PENNA. INST. OF RESEARCH. 10-181 10-2724 LEWIS FLIGHT PROPULSION LAB., CLEVELAND. 10-234 LITTLE, ARTHUR D. INC., CAMBRIDGE, MASS. 10-1778 10-1819 10-2093 LITTLE, ARTHUR D. UNCL., WESTERN LABS., SAN FRANCISCO. 10-1299 10-1321 10-2038 LOS ALAMOS SCIENTIFIC LAB., N. MEX. 10-15 10-125 10-146 10-200 10-228 10-231 10-307 10-319 10-483 10-487 10-562 10-741 10-757 10-993 10-994 10-1085 10-1145 10-1200 10-1230 10-1619 10-1640 10-1739 10-1760 10-1836 10-2171 10-2257 10-2282	MASSACHUSETTS INST. OF TECH., CAMBRIDGE. 10-843 10-955 10-1341 10-1342 10-1781 10-1812 10-2193 10-3012 10-3189 10-3309 10-3425 10-3526 10-3563 10-3611 10-3739 MASSACHUSETTS INST. OF TECH., CAMBRIDGE. DEPT. OF METALLURGY. 10-183 10-184 10-1383 10-1384 10-1385 10-2069 10-2081 10-2082 MASSACHUSETTS INST. OF TECH., CAMBRIDGE. DEPT. OF METALLURGY. 10-3285 10-3363 10-3817 MASSACHUSETTS INST. OF TECH., CAMBRIDGE. DIV. OF INDUSTRIAL COOPERATION. 10-828 MASSACHUSETTS INST. OF TECH., CAMBRIDGE. LAB. FOR NUCLEAR SCIENCE. 10-611 10-1506 10-1905 10-3329 MASSACHUSETTS INST. OF TECH., CAMBRIDGE. METALLURGICAL PROJECT 10-610 10-836 10-837 10-1740 10-1766 10-2435 MASSACHUSETTS INST. OF TECH., CAMBRIDGE. MINERAL ENGINEERING LAB. 10-2392 MASSACHUSETTS INST. OF TECH., CAMBRIDGE. SERVOMECHANISMS LAB. 10-2542 MASSACHUSETTS INST. OF TECH., OAK RIDGE, TENN. ENG. PRACTICE SCHOOL 10-2105 10-2404 10-3482 10-3554 MASSACHUSETTS INST. OF TECH., WATERTOWN, MASS. MINERAL ENGINEERING LAB. 10-3347 MERRILL CO., SAN FRANCISCO. 10-723 10-1298 METAL HYDRIDES INC., BEVERLY, MASS. 10-2255 10-2616 METALLURGICAL ADVISORY COMMITTEE ON TITANIUM. 10-179 METALLURGY DEVELOPMENT ADVISORY COMMITTEE, AEC. 10-855 MICHIGAN STATE COLL., EAST LANSING. 10-50 10-1723 MICHIGAN STATE COLL., EAST LANSING. KEDZIE CHEMICAL LAB. 10-632 10-633 MICHIGAN STATE UNIV., EAST LANSING. 10-2970 MICHIGAN UNIV., ANN ARBOR. 10-564 10-565 10-1208 10-3715 10-3767	10-2297 10-2300 10-2348 10-2351 10-2386 10-2389 10-2443 10-2491 10-2506 10-2568 10-3155 10-3506 10-3648 10-3749 10-3267 10-3801 10-1341 10-1812 10-3189 10-3526 10-3739 10-1383 10-2069 10-1905 10-837 10-2435 10-3790 10-3120 10-3833 10-1164 10-1165 10-2708 10-1871 10-2592 10-2725 10-586 10-891 10-1382 10-1871 10-2592 10-2725 10-2858 10-2725 10-81

- NEW HAMPSHIRE, UNIV., DURHAM,  
10-3747  
NEW YORK OPERATIONS OFFICE, AEC.  
10-851  
NEW YORK OPERATIONS OFFICE, HEALTH AND SAFETY LAB., AEC.  
10-10 10-252 10-2248  
NEW YORK OPERATIONS OFFICE, SPECIAL MATERIALS DIV., AEC.  
10-2446  
NEW YORK, STATE UNIV. COLL. OF CERAMICS, ALFRED.  
10-790 10-791 10-894  
NEW YORK UNIV., NEW YORK.  
10-251  
NEW YORK UNIV., NEW YORK. ATOMIC ENERGY COMMISSION COMPUTING FACILITY.  
10-235 10-2805  
NEW YORK UNIV., NEW YORK. COLL. OF ENGINEERING.  
10-172 10-754 10-848  
NORTH AMERICAN AVIATION, INC., DOWNEY, CALIF.  
10-1495 10-2258 10-2318  
10-2497 10-2544 10-2554  
10-2555 10-2649 10-2968  
10-3149 10-3156 10-3254  
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10-3405 10-3479 10-3738  
10-3786 10-3797 10-3853  
10-3874 10-3882 10-3889  
NORTH AMERICAN AVIATION, INC., LOS ANGELES.  
10-2316 10-2317 10-2319  
10-2320 10-2407 10-2445  
10-2465 10-2492 10-3672  
NORTH CAROLINA STATE COLL., RALEIGH.  
10-1099 10-1557 10-2814  
10-2896  
NORTHWEST ELECTRODEVELOPMENT LAB., ALBANY, OREG.  
10-1390 10-3132  
NUCLEAR DEVELOPMENT ASSOCIATES, INC., WHITE PLAINS, N. Y.  
10-312 10-1496 10-1497  
10-1558 10-1559 10-1560  
10-1561  
NUCLEAR DEVELOPMENT CORP. OF AMERICA, WHITE PLAINS, N. Y.  
10-332 10-3150  
NUCLEAR METALS, INC., CAMBRIDGE, MASS.  
10-2077  
NUCLEAR POWER GROUP, CHICAGO.  
10-1151  
OAK RIDGE GASEOUS DIFFUSION PLANT, TENN.  
10-1335 10-3353 10-3374  
10-3837 10-3841 10-3842  
10-3883  
OAK RIDGE INST. OF NUCLEAR STUDIES, INC., TENN.  
10-544 10-3773  
OAK RIDGE NATIONAL LAB., TENN.  
10-42 10-43 10-82  
10-105 10-129 10-130  
10-210 10-244 10-320  
10-489 10-579 10-612  
10-720 10-721 10-884  
10-942 10-1013 10-1016  
10-1118 10-1168 10-1240  
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10-3742 10-3744 10-3756  
10-3768 10-3798 10-3805  
10-3850 10-3859 10-3860  
10-3875 10-3880 10-3890  
OAK RIDGE NATIONAL LAB., Y-12 AREA, TENN.  
10-2280 10-2476 10-3274  
10-3278 10-3794 10-3836  
OHIO STATE UNIV. RESEARCH FOUNDATION, COLUMBUS.  
10-132 10-764 10-788  
10-789 10-1347 10-1896  
OLIN MATHIESON CHEMICAL CORP., BALTIMORE.  
10-573 10-574 10-1721  
10-1722 10-1723 10-1724  
10-1725  
OREGON, UNIV., EUGENE.  
10-561  
PENNSYLVANIA SALT MFG. CO., PHILADELPHIA.  
10-739  
PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.  
10-149 10-1727  
PENNSYLVANIA STATE UNIV., UNIVERSITY PARK COLL. OF CHEMISTRY & PHYSICS.  
10-2008  
PENNSYLVANIA STATE UNIV., UNIV. PARK, MINERAL INDUSTRIES EX. STATION  
10-1720  
PENNSYLVANIA STATE UNIV., UNIVERSITY PARK, PETROLEUM REFINING LAB.  
10-892  
PENNSYLVANIA, UNIV., PHILADELPHIA.  
10-53 10-883  
PHILLIPS PETROLEUM CO., ATOMIC ENERGY DIV., IDAHO FALLS, IDAHO.  
10-115 10-128 10-241  
10-373 10-377 10-378  
10-379 10-380 10-381  
10-567 10-746 10-839  
10-1027 10-1035 10-1036  
10-1037 10-1038 10-1039  
10-1040 10-1041 10-1042  
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10-1052 10-1053 10-1054  
10-1087 10-1100 10-1144  
10-1316 10-1453 10-1555  
10-1737 10-1907 10-1924  
10-1925 10-2026 10-2108  
10-2139 10-2142 10-2161  
10-2162 10-2165 10-2166  
10-2449 10-2483 10-2655  
10-2750 10-2886 10-2887  
10-2888 10-2889 10-2890  
10-2891 10-2892 10-2893  
10-2894 10-3040 10-3041  
10-3147 10-3148 10-3157  
10-3158 10-3310 10-3381  
10-3401 10-3717 10-3825  
10-3856 10-3870 10-3871  
PHILLIPS PETROLEUM CO., ATOMIC POWER DIV., IDAHO FALLS, IDAHO.  
10-3855  
PITTSBURGH, UNIV.  
10-2023 10-2997  
PITTSBURGH, UNIV. GRADUATE SCHOOL OF PUBLIC HEALTH.  
10-2006  
PRATT & WHITNEY AIRCRAFT Div., UNITED AIRCRAFT CORP., HARTFORD, CONN.  
10-131  
PRINCETON UNIV., N. J.  
10-2305 10-2365  
PRINCETON UNIV., N. J. FRICK CHEMICAL LAB.  
10-3493  
PRODUCTION ENG., RES. ASSN. OF GT. BRITAIN, MELTON MOWBRAY LEICS, ENGLAND.  
10-187  
PURDUE RESEARCH FOUNDATION, LAFAYETTE, IND.  
10-2270 10-2271 10-2314  
10-2366 10-2367 10-2368  
10-2372 10-2373 10-2374  
PURDUE UNIV., LAFAYETTE, IND.  
10-2269 10-2270 10-2271  
10-2310 10-2314 10-2324  
10-2341 10-2366 10-2367  
10-3492 10-3517 10-3518  
QUARTERMASTER FOOD AND CONTAINER INST., CHICAGO.  
10-17 10-18  
RADIATION LAB., UNIV. OF CALIF., BERKELEY.  
10-1585  
RADIATION RESEARCH CORP., WEST PALM BEACH, FLA.  
10-318  
RAND CORP., SANTA MONICA, CALIF.  
10-909 10-1089 10-1129  
10-1438 10-1836 10-2226  
10-2783 10-2784  
RAYTHEON MFG. CO., NEWTON, MASS.  
10-824  
REDSTONE ARSENAL, ORDNANCE MISSILE LABS., HUNTSVILLE, ALA.  
10-2109  
RENSELAER POLYTECHNIC INST., TROY, N. Y.  
10-1811  
RENSELAER POLYTECHNIC INST., TROY, N. Y. POWDER METALLURGY LAB.  
10-3613 10-3614  
RICHMOND, VA. UNIV.  
10-57  
ROCHESTER, N. Y. UNIV.  
10-1003 10-1015 10-3414  
ROCHESTER, N. Y. UNIV. ATOMIC ENERGY PROJECT.  
10-4 10-19 10-20  
10-545 10-548 10-556  
10-614 10-957 10-1776  
10-1982 10-1983 10-1984  
10-2243 10-2974 10-3092  
10-3096 10-3097 10-3099  
10-3100 10-3168 10-3253  
10-3255 10-3257 10-3258  
10-3259 10-3260 10-3771  
ROHM AND HAAS CO., PHILADELPHIA.  
10-2991  
ROHM AND HAAS CO. RESEARCH LABS., PHILADELPHIA.  
10-107 10-722 10-723  
10-724 10-1767 10-2015  
10-2035 10-2036 10-2037  
10-2617 10-2664 10-2665  
10-2686 10-2687 10-2688  
10-2689 10-2690 10-2992  
10-3114 10-3115 10-3277  
10-3342 10-3343  
RUTGERS UNIV., NEW BRUNSWICK, N. J.  
10-1219  
RUTGERS UNIV., NEW BRUNSWICK, N. J. COLL. OF ENGINEERING.  
10-3133  
RYAN AERONAUTICAL CO., LINDBERGH FIELD, SAN DIEGO, CALIF.  
10-1366  
SANDIA CORP., ALBUQUERQUE, N. MEX.  
10-845 10-1331 10-3288  
SCHOOL OF AVIATION MEDICINE, RANDOLPH AFB, TEXAS.  
10-1166 10-1717  
SHELL DEVELOPMENT CO., EMERYVILLE, CALIF.  
10-584 10-585  
SOUTHWEST RESEARCH INST., SAN ANTONIO.  
10-737 10-1730 10-1780  
STANDARD OIL CO. OF INDIANA, WHITING.  
10-2055  
STANFORD RESEARCH INST., MENLO PARK, CALIF.  
10-635 10-2019  
STANFORD UNIV. OAKI AKTI, CALIF. W. W. HANSEN LABS. OF PHYSICS.  
10-1014  
STANFORD UNIV., PALO ALTO, CALIF. MICROWAVE LAB.  
10-406 10-1079  
SYLVANIA ELECTRIC PRODUCTS INC., ATOMIC ENERGY DIV., BAYSIDE, N. Y.  
10-854 10-1803 10-1815  
10-1816 10-2447  
SYLVANIA ELECTRIC PRODUCTS INC., BAYSIDE, N. Y.  
10-3818  
SYLVANIA ELECTRIC PRODUCTS INC., METALLURGICAL LABS., BAYSIDE, N. Y.  
10-3819  
TECHNICAL INFORMATION SERVICE, AEC.  
10-502 10-1170 10-1817  
10-2168 10-2579 10-2726  
10-2727 10-3043 10-3128  
10-3169 10-3179 10-3235  
10-3256 10-3283 10-3301  
10-3876  
TENNESSEE EASTMAN CORP., OAK RIDGE, TENN.  
10-1317 10-3140 10-3162  
10-3210 10-3481 10-3527  
10-3529 10-3530 10-3531  
10-3534 10-3535 10-3536  
10-3537 10-3538 10-3539  
10-3540 10-3541 10-3542  
10-3543 10-3544 10-3545  
10-3546 10-3590 10-3592  
10-3619 10-3634 10-3754  
TENNESSEE, UNIV., KNOXVILLE.  
10-83 10-763 10-1169  
10-2062 10-3769  
TENNESSEE VALLEY AUTHORITY, WILSON DAM, ALA.  
10-2259 10-2260 10-2261  
10-2262 10-2263 10-2264  
10-2265 10-2266 10-3418  
TEXAS, UNIV., AUSTIN. SANITARY ENGINEERING LABS.  
10-3101 10-3341  
TRACERLAB, INC., WESTERN DIV. BERKELEY, CALIF.  
10-2626  
TRUDEAU FOUNDATION, SARANAC LAKE, N. Y.  
10-2969  
TUFTS UNIV., MEDFORD, MASS.  
10-1320 10-1641 10-1728  
10-3124 10-3276  
UNION CARBIDE NUCLEAR CO., PADUCAH PLANT, KY.  
10-3203  
UNION CARBIDE NUCLEAR CO. Y-12 PLANT, OAK RIDGE, TENN.  
10-84 10-616 10-3027  
UNITED KINGDOM ATOMIC ENERGY AUTHORITY, IND. GP. H. O., RISLEY LANCs, ENGLAND.  
10-1055 10-1060  
UNIVERSITY OF SOUTHERN CALIF., LOS ANGELES.  
10-1214  
UTAH, UNIV., SALT LAKE CITY.  
10-885 10-886 10-995  
10-1721 10-1722  
UTAH, UNIV., SALT LAKE CITY. INST. FOR THE STUDY OF RATE PROCESSES.  
10-890 10-1380  
UTAH, UNIV., SALT LAKE CITY. RADIOBIOLOGY LAB.  
10-1160  
VIRGINIA POLYTECHNIC INST., BLACKBURG.  
10-56  
VITRO CORP. OF AMERICA, NEW YORK.  
10-2322 10-2403 10-3635  
WADSWORTH GENERAL HOSPITAL, VETERANS ADMINISTRATION CENTER, LOS ANGELES.  
10-956 10-1725  
WASHINGTON AND LEE UNIV., LEXINGTON, VA.  
10-2064  
WASHINGTON UNIV., ST. LOUIS.  
10-2127  
WATERTOWN ARSENAL LAB., MASS.  
10-194 10-627 10-1398  
10-2734



WEST VIRGINIA, UNIV.,	10-1823	10-2084	10-2194	WISCONSIN ALUMNI RESEARCH	WRIGHT AIR DEV. CENTER.
MORGANTOWN.	10-2467	10-2918	10-3008	FOUNDATION.	MATERIALS LAB., WRIGHT-
10-59	10-3015	10-3139	10-3151	10-3519	PATTERSON AFB, OHIO
WESTERN RESERVE UNIV.,	10-3188	10-3237	10-3403	WISCONSIN UNIV MADISON	10-860 10-929 10-2645
CLEVELAND. SCHOOL OF	10-3615	10-3616	10-3877	10-118	10-2730 10-2735
MEDICINE.	WESTINGHOUSE ELECTRIC CORP.			WISCONSIN, UNIV., MADISON.	WYANDOTTE CHEMICAL CORP.,
10-1167	BETTIS PLANT, PITTSBURGH.			NAVAL RESEARCH LAB.	10-191 10-193
WESTINGHOUSE CORP. ATOMIC	10-3372 10-3839			10-245	
POWER DIV., PITTSBURGH.	WESTINGHOUSE ELECTRIC CORP.			WRIGHT AIR DEV. CENTER.	
10-781	INDUSTRIAL ATOMIC POWER			AERO. RES. LAB., WRIGHT-	
WESTINGHOUSE ELECTRIC CORP.	GROUP, PITTSBURGH.			PATTERSON AFB, OHIO	
ATOMIC POWER DIV.,	10-3249			10-2790	
PITTSBURGH.	WESTINGHOUSE ELECTRIC CORP.			WRIGHT AIR DEV. CENTER. COM-	
10-195 10-313 10-829	RESEARCH LABS., EAST			PONENTS SYST. LAB., WRIGHT-	
10-855 10-1399 10-1544	PITTSBURGH, PENNA.			PATTERSON AFB, OHIO.	
10-1562 10-1804 10-1822	10-2797			10-2731	
					YALE UNIV., NEW HAVEN,
					10-2147 10-2767
					YALE UNIV., NEW HAVEN.
					SCHOOL OF ENGINEERING.
					10-654





# SUBJECT INDEX

The number followed by a colon is the volume number, and the numbers following are the abstract numbers. The designation (R) following an abstract number indicates that it is an abstract of a progress report; the designation (J) indicates that it is an abstract of a journal (published literature) article; and the designation (P) indicates that it is an abstract of a patent. Abstract numbers for reports other than progress reports carry no letter designations.

## A

### Abernathyites

crystallography, 10: 2066

### Accelerator targets

(See Materials Testing Accelerator targets.)

### Accelerator tubes

for strong-focusing Cockcroft-Walton accelerator, design, 10: 3045

### Accelerators

(See also specific accelerators, e.g. Betatrons; Bevatron.)

bibliography and list, 10: 1585

charged particle, review article, 10: 1591(J)

critical energy in strong focusing, 10: 1588(J)

design of cascade, 10: 3144(R)

design of cascade generator, 10: 1936(J)

development, 10: 3854

development of high-current, historical review, 10: 2185(J)

electron analogue, for synchrotron orbital properties determination, 10: 1592(J)

glo-ball development for electric field measurements in, 10: 928

ion source for Cockcroft-Walton, 10: 1507(R)

neutron production by, 10: 1502(J)

operation of low voltage, 10: 3649(R)

particle detection, trigger circuits for, 10: 2907(J)

### Acetaldehyde

synthesis of H<sup>3</sup>-labeled, 10: 1729(R)

### Acetates

(See also specific acetates, e. g. Sodium Americyl acetates, Sodium neptunyl acetates.)

metabolism in mice, tracer study, 10: 2907(J)

### Acetic acid

coulometric determination of micro amounts, 10: 2289

radiation chemistry, 10: 1696(R)

### Acetic acid, amino-

(See Glycine.)

### Acetic acid (ethylenediamine) tetra-

as analytical reagent for chemical determinations, 10: 3108

### Acetic acid, (ethylenedinitrilo) tetra-

(See Acetic acid (ethylenediamine) tetra-.)

### Acetic acid, iodo-

cataracts induced by injected, in rabbits, 10: 1717

### Acetone, thenoyltrifluoro-

analytical uses for separation of Zr from Hf, 10: 3340

distribution between HNO<sub>3</sub> and organic solvents, 10: 2333

solvent properties for U, 10: 2333, 3566

synthesis, 10: 2343

### Acetones, halo-

polarographic behavior, 10: 1251(J)

### Acetonitrile, trifluoro-

infrared and Raman spectra, 10: 2948(J)

### Acetylene

preparation of labeled, 10: 3795

### Acid phosphates

(See Barium acid phosphates.)

### Acids

(See also specific acids, e.g. Carbonic acids; Fatty acids.)

coulometric determination, 10: 2292

dissociation constants of dibasic, spectrochemical determination of, 10: 582

solvent extraction from H<sub>2</sub>O with  $\beta$ ,  $\beta$ -dichloroethyl ether, 10: 3329(R)

### Acrylamide

molecular and radical yields from x irradiation of aqueous solutions of, 10: 99(J)

### Acrylic acid, methyl ester polymers

paramagnetic resonance in, x-irradiation effects on, 10: 2217(J)

### ACTH

(See Adrenocorticotrophic hormone.)

### Actinide compounds

preparation, crystal structure, and optical properties, 10: 2391

### Actinides

(See also Rare earths; Transuranic elements.)

electrodeposition from acid solutions, 10: 3275

ion exchange on Dowex-1 with NH<sub>4</sub>SCN, 10: 3116

radiochemical determination and separation from fission products, 10: 3267

separation from rare earths by ion exchange, 10: 3116

### Actinium

(See also Actinides.)

biological effects on laboratory animals, 10: 1112

separation from aqueous solutions of heavy elements by cation exchange, 10: 3053(P)

### Actinium isotopes Ac<sup>227</sup>

pathological effects when injected into rats and mice, 10: 2966

Actinium isotopes Ac<sup>227</sup> (cont'd)

- radiometric determination, 10: 3844
- separation from La by ion exchange, 10: 108(J)
- tissue distribution in rats, 10: 3165(R)

## Addition compounds

- formation constants, estimation, 10: 2008

## Adenine

- metabolism by chick embryos, effects of  $\gamma$  irradiation, tracer study, 10: 1182(J)
- metabolism in mice, tracer study, 10: 3104

## Adrenal glands

- influence on spleen-thymus radiosensitivity, 10: 1987(J)
- radiosensitivity in rats, 10: 3408(R)
- radiosensitivity of, measured by ascorbic acid depletion and histologic alterations in rats, 10: 1174(J)

## Adrenaline

- acute pulmonary edema following administration of, central nervous system mediation of, 10: 509

## Adrenocorticotrophic hormone

- effects of, on radiation sickness syndrome, 10: 538(J)
- physiological effects on rat thymus, 10: 3767

## Adsorption

- of strontium by soils of Hanford project, 10: 3183
- of sulfuric acid on platinum coated platinum, investigation with labeled atoms, 10: 736(J)
- of vapors near saturation point, study by optical and micropolarization method, 10: 2040(J)

## Adsorption separation processes

(See also Ion exchange processes.)

- development of a char-in-pulp process for recovery of U from ores, 10: 1321

## Aerial monitoring

(See Aerial surveying.)

## Aerial prospecting

(See Aerial surveying.)

## Aerial surveying

- for natural radioactivity of region between St. Louis, Mo. and Moline, Ill., 10: 43(R)

## Aerojet General Corp., Azusa, Calif.

- progress reports on inorganic and organic polymers, 10: 2670(R)
- progress reports on inorganic and semi-organic polymers, 10: 54(R)

## Aerosols

(See also Colloids; Dust hazards; Particles; Powders.)

- filter paper efficiency for removal of alpha-emitting, 10: 3617
- impaction, efficiency of sand for, 10: 43(R)
- method of measuring, cascade filtration theory, 10: 1846
- particle size measurement, 10: 42(R)
- particle size measurement of, performance of a cloud chamber for, 10: 210
- sampling for Pu dust and separation by particle size, design and equipment, 10: 2828(J)

## Agriculture

(See also Tracer techniques (agriculture).)

- trace element availability in soils, effect on plant and animal nutrition, 10: 1155(J)

## Air

(See also Atmosphere; Gases; Stack disposal.)

## Air (cont'd)

- absorption coefficients and opacity for, at given temperature and pressure, 10: 1089
- absorption coefficients from 6000°K to 18,000°K, 10: 2784
- alpha emitting contaminants, filter paper efficiency for removal, 10: 3617
- alpha radioactivity in, fast ionization chamber measurement of, 10: 270(J)
- analysis for inert gases, 10: 3293
- analysis for trace boranes, 10: 2611
- analysis for U, 10: 3175
- cleaning and sampling, efficiency of filter media, 10: 3779
- contamination, relationship to fall-out, 10: 2592
- contamination, relationship to surface activity, 10: 1994
- contamination of, assaying procedures, 10: 10
- corrosive effects on Th, 10: 3356
- decontamination, 10: 2610
- decontamination, dust collectors for, 10: 1159(J)
- drying in activated alumina beds, 10: 3018
- gamma transmission through slots, in H<sub>2</sub>O, 10: 3394
- impulse discharge in, from 50 to 110 kev, 10: 226(J)
- krypton contamination, procedures for determination, 10: 3657
- monitoring for  $\alpha$  activity from radon, equipment, 10: 3302(J)
- neutron and  $\gamma$  transmission through slots, 10: 3393
- neutron distributions around slots, in H<sub>2</sub>O, 10: 3397
- neutron transmission through slots, effect of multiple offsets on, 10: 339
- neutron transmission through slots, effects of wall materials on, 10: 3868
- neutron transmission through slots, effect of vertical position of single on, 10: 3395
- neutron transmission through straight slots of, in H<sub>2</sub>O, 10: 3867
- sampling equipment, design and performance, 10: 3411
- sampling for assay of radioactive and other contaminants, 10: 1778(R)
- scattering of Co<sup>60</sup>  $\gamma$  rays by, comparison of theory and experiment, 10: 3880
- thermal conductivities and accommodation coefficients of, for chrome surfaces at reduced pressures, 10: 2782
- thermodynamic properties and composition at elevated temperatures, 10: 2783
- turbulent flow, pressure drop in, 10: 1334(J)

## Air cooled reactors

(See Brookhaven Reactor.)

## Aircraft

(See also Nuclear aircraft.)

- equipment cooling systems, properties of liquids for use in, 10: 764
- fuel flow, design of electric flowmeter applicable to measurement of, 10: 2790

## Aircraft reactors

(See also Nuclear aircraft.)

- shielding for thermal neutrons, design and construction, 10: 3083(P)

## Aircraft Shield Test Reactor

- ground handling equipment, description and maintenance data, 10: 2895

## Alabama

- geology, radiometric reconnaissance, 10: 2064

## Alanine

- radioinduced decomposition, 10: 2029(J)

## Alanine, B- mercapto-

(See Cysteine.)

## Alaska

exploration of Ear Mountain Area in, 10: 1362(J)

reconnaissance for U in, 10: 2067(R)

## Albumins

alteration of ultraviolet and infrared spectra of, by radiation, 10: 525(J)

effects of ultraviolet and x radiation on, 10: 534(J)

pepsin digestion of serum, irradiated by  $\gamma$  rays, 10: 2581(J)

## Aldehydes

hydrogen exchange in, saturated with deuteriophosphoric acid, 10: 598(J)

reactions of hydrogen exchange in, 10: 601(J)

## Algae

behavior, chemical factors, 10: 2571

metabolism in, tracer study, 10: 3768(J)

metabolism of thioacetic acid in, 10: 1729(R)

photosynthesis and cation transport, theory, 10: 3164

symbiosis with bacteria in oxidation ponds, fixation of radioisotopes, 10: 3101

## Alice Fraction Prospect (Nev.)

mineralogy, 10: 1358

## Alkali metal halide crystals

optical absorption of irradiated, 10: 2497(R)

optical properties, x-radiation effects on, 10: 2767

secondary electron emission, 10: 1855(J)

## Alkali metal halides

radiolysis, absorption spectra of products, 10: 2214(J)

## Alkali metal hydroxides

colorimetric analysis for chromium and vanadium in sub-microgram quantities, 10: 3109

## Alkali metals

spectrophotometric determination of small amounts of, in water, 10: 84

surface tension in diluted-to-capacity amalgams of, 10: 602(J)

## Alkali metals (liquid)

wetting properties, effects of temperature and pretreatment of surfaces, 10: 120(R)

## Alkaline earth borohydrides

preparation of Ba, Ca, and La borohydrides, 10: 58

## Alkaline earth metals

separation and estimation by paper chromatography, 10: 1307(J)

## Allegheny Formation (Penna.)

geology, radioactivity of coals and associated rocks in, 10: 2065

geology and coal deposits in, 10: 152

## Allegheny Ludlum Steel Corp. Research Dept., Watervliet, N. Y.

progress reports on development of high-temperature alloys, 10: 826(R)

## Alloys

(See also specific alloys, e.g. Aluminum alloys; Beryllium alloys.)

corrosive effects of fused NaOH on, 10: 3282

deoxidation of vacuum melted, 10: 1833(J)

fatigue failure in, with annealing twins, 10: 1824(J)

inclusion removal, design and performance of ultrasonic "jack-hammer," 10: 3357

melting process for higher quality super, 10: 199(J)

metallurgical aspects of, book, 10: 877(J)

theory, 10: 3361

## Alloys (cont'd)

vacuum distillation, 10: 1833(J)

vacuum distillation of, for separation of components, 10: 2074

vacuum melting of alloy materials, 10: 1833(J)

vapor pressure determinations, 10: 1833(J)

## Alpha beams

graphite resistivity changes from exposure to, 10: 2317

## Alpha decay

correlation phenomena, 10: 1623(J)

internal atomic excitation, method for calculating probabilities, 10: 453(J)

rates of, correlations with energy, 10: 1948

## Alpha particles

angular distribution, from reaction  $F^{19}(p,\alpha)O^{16*}$ , 10: 2910(J)

attenuation of, by gases, 10: 516(R)

bremsstrahlung, deviations from additive law in, 10: 1904(J)

counting, manual, 10: 2112

detection and measurement, design of pulse analyzer for, in presence of  $\beta$  particles, 10: 1674(P)

detection and measurement, performance of proportional detectors, 10: 3375

detection and measurement, portable scintillation counter for, 10: 3080(P)

detection and measurement of, from  $Ac^{227}$ ,  $Ra^{226}$ , and  $Th^{232}$  in urine samples, 10: 3844

detection and measurement of, from traces of U, 10: 3123

detection and measurement of, in blood, feces, and urine, 10: 606

detection by ZnS phosphor, optimum conditions for, 10: 264(J)

detection in air by fast ionization chamber, 10: 270(J)

effects on phosphorus metabolism in E. coli, 10: 3252

emission after proton bombardment at 1000 Mev, 10: 424(J)

gamma radiation angular correlations, 10: 1623(J)

ionization of gas mixtures by, 10: 2924(J)

ionization of K shell of various elements by, 10: 2871(J)

in measuring diffusion of matter through plates, 10: 440(J)

neutrons scattered by, theoretical study of phase shifts in, 10: 2952(J)

nuclear reaction  $Be^9(\alpha,n\gamma)C^{12}$  produced by,  $\gamma$  radiation from, 10: 1575(J)

pathological effects of, from injected Po, in rats, 10: 2578

pathological effects of, from polonium, on reticulo-endothelial system, tracer study, 10: 1983

pathological effects of, on laboratory animals and plants, 10: 513(R)

from polonium, detection and measurement in urine samples, 10: 2278

from polonium<sup>210</sup>, pathological effects following intratracheal administration to rats, 10: 3260

proportional detectors for, 10: 2118(J)

from radon, detection and measurement in air samples, 10: 3302(J)

from radon, pathological effects of exposure to atmosphere containing, on mice, 10: 548

range spectra for, in the  $C^{12}(p,\alpha)B^9$  reaction, 10: 3222(R)

scattering, theory, 10: 3329(R)

scattering of 22-Mev, by  $C^{12}$ , 10: 354(J)

spark detectors for counting, characteristics and design, 10: 2846(J)

ultraviolet emission following irradiation of H and D by, 10: 2786(J)

work function for ion pairs in polyatomic gases by, 10: 1856(J)

## Alpha sources

spectrographic analysis, 10: 2502



## Aluminum

activation in the MTR, 10: 1100

attenuation of 275 to 525-kv x radiation in, 10: 1960(J)

bonding, surface treatment for adhesive, 10: 191

bremstrahlung differential cross section of, for 0.5- and 1.0-Mev electrons, 10: 2780(J)

bremstrahlung in, from absorption of  $S^{95}$  electrons, 10: 477(J)

chromatographic determination following dissolution of corrosion films, 10: 3107

cleaning with trichloroethylene, procedures and hazards, 10: 2614

compressibility index for comparison with other metals, 10: 1820

corrosion, effects of surface properties and annealing temperature on, 10: 1348(J)

corrosion, review, 10: 1349(J)

corrosion and chemical oxidation for plugging holes in, while in use in reactors, 10: 3608

corrosion by water, effects of coagulants, 10: 2431

corrosion in 500 and 600°F water, 10: 1806

corrosion in superheated steam, 10: 2705(J)

corrosion of 2S, in aqueous solutions at 200°C, 10: 3355

corrosion of 72-S and 2-S Al cladding by chromated water, 10: 3805

corrosion protection, alodine process for, 10: 2706(J)

creep, measurement, 10: 2465

creep-rupture of 2S-O sheet at 500 and 550°C, 10: 2439

determination and formation of Al oxide films on, 10: 2737(J)

determination in samples containing F, U, and Zr, 10: 1737

determination of, in presence of small amounts of U, 10: 62

determination of, in U concentrates, 10: 660(R)

determination of Na content in metallic, 10: 875(J)

deuterium diffusion in, by deuteron irradiation of, 10: 1938

diffusion of U into, in temperature range 200 to 390°C, 10: 2091

dissolution, effects of impurities on, 10: 1348(J)

dynamic stress-strain relations for annealed 2S, under compression impact, 10: 178

effects on mechanical properties of Ti and Ti alloys, 10: 1388

electrodeposition on Zr and Zr alloys, 10: 3358

electron and positron transmission in, 10: 1441(J)

electroplating with Bi and Ni, 10: 3815

electropolishing and micrographic examination of, 10: 873(J)

excitation potential determination and range-energy relations, 10: 311(J)

gamma activity induced in, by reactor radiation, 10: 3678

gamma heating effect, in MTR, 10: 2918

gamma heating of, in MTR, 10: 1043

gamma rays excited by inelastic scattering of 3.7-Mev neutrons in, 10: 3034(R)

gamma scattering, 10: 2549

grain-boundary diffusion in Cu, 10: 1814(R)

heat transfer in, sheaths for fuel rods, 10: 3713

inelastic neutron scattering,  $\gamma$  rays excited by, 10: 432(J)

intercrystalline corrosion, effects on grain boundaries, 10: 3191(J)

machining, cutting and non-cutting, use of lubricants, 10: 3823(J)

mechanical and physical properties, effect of fast neutron irradiation on, 10: 2193

moderating characteristics of foil holders, 10: 3154

neutron and proton cross sections, 10: 1507(R)

neutron capture  $\gamma$  spectrum, 10: 3655

## Aluminum (cont'd)

neutron cross sections, 10: 3650(R)

neutron irradiation effects, number and range of atoms dislodged, 10: 2548

neutron polarization in elastic scattering, 10: 439(J)

neutron reactions ( $n, \alpha$ ), ( $n, p$ ), and ( $n, \gamma$ ), and use as neutron detector, 10: 3646

neutron reactions ( $n, p$ ) at 14 Mev, cross sections, 10: 338(J)

neutron resonances, 10: 3144(R)

photoneutrons produced in, energy and angular distributions of, 10: 1899(J)

plastic deformation, change of Poisson's coefficient during, 10: 870(J)

plastic deformation in annealed, 10: 1813

proton bombardment, formation of  $Na^{22}$  from, 10: 3660

proton resonances ( $p, \gamma$ ) in, 10: 1909(J)

proton scattering cross section, 10: 1009(R)

protons elastically scattered from, polarization of, 10: 1593(J)

radiation effects, from neutron bombardment, 10: 2552

radiation effects of deuterons on targets of, 10: 1938

reactivity changes in MTR due to reduction of, in core, 10: 1042

reactor criticality effects in MTR, 10: 1047

solubility of, in  $AlI_3$ , 10: 62

solvent extraction, 10: 705(R)

solvent extraction from carnotites with TBP, 10: 694(R)

solvent extraction of, from carnotite leach solutions, 10: 708(R), 709(R), 710(R)

solvent extraction of, from plateau and Utex ores, 10: 712(R)

solvent extraction of, from uranium leach solutions, 10: 707(R), 711(R)

spectrographic determination in  $ZrH_2$ , 10: 610

spectrophotometric determination in Ca, 10: 609

static potential measurements, 10: 887

stress, effect of strain rate and temperature on deformation of high purity, 10: 2079

tensile properties, 10: 2442

tubes, fabrication and properties of, 10: 2441

## Aluminum (liquid)

chemical reactions with  $H_2O$  under reactor conditions, 10: 567

reactions with  $H_2O$ , 10: 560

## Aluminum alloys

corrosion by distilled and borated deionized  $H_2O$  at temperatures up to 500°F, 10: 3006

corrosion by Pentalene 290, 10: 3005

corrosion by water, effects of coagulants, 10: 2431

corrosion by water-d, 10: 3592

corrosion-erosion of, 10: 1347

corrosion protection, alodine process for, 10: 2706(J)

corrosion rates, 10: 792

corrosion when exposed under applied potentials in condensate water, 10: 2429

creep, fatigue, and stress properties at temperatures from 300 to 500°F, 10: 2732

electropolishing and micrographic examination of, 10: 873(J)

fatigue-dilation, thermal expansion, and mechanical properties of 61S-T6, 10: 2069

high-temperature corrosion by distilled  $H_2O$ , 10: 3190

porosity in cast, use of  $H^3$  to study, 10: 845

properties of 7075-0, and extrusion of, 10: 828(R)

## Aluminum alloys (cont'd)

- spectrophotometric analysis for Cr, Mn, Ni, Ti, and Fe in, 10: 860
- stress-fatigue strength of, through the range 1/2 to 500,000,000 cycles of stress, 10: 2075
- thermal expansion, thermal conductivity, and specific heat, 10: 2735

## Aluminum borohydrides

- nuclear magnetic resonance and molecular structure, 10: 2223(J)

## Aluminum-boron carbide systems

- composition analysis at LTSE, 10: 3325

## Aluminum chelates

- with 8-hydroxyquinoline, preparation, spectra, thermal stability, and polymerization, 10: 64(R)

## Aluminum chloride etherates

- melting point and vapor pressure, 10: 574

## Aluminum chloride-lithium chloride-potassium chloride-sodium chloride systems

- phase studies, 10: 57

## Aluminum-chromium-iron alloys

- effect of adding Pt, Pa, Nb, Mo, Ta, W, on oxidation resistance and tensile properties, 10: 834

## Aluminum-chromium-silicon coatings

- for molybdenum, microstructure and oxidation, 10: 2083

## Aluminum-cobalt alloys

- hardness, temperature dependence of, and constitution diagrams, 10: 2090(J)

## Aluminum compacts

- effects of elevated temperatures on sintered Al powders, 10: 866

## Aluminum compounds

- copolymerization reactions with Si compounds, 10: 64(R)

## Aluminum-copper alloys

- grain structure, effects of vibrations on, 10: 180

## Aluminum-copper-magnesium alloys

- strength and creep properties of 2024-T3, at elevated temperatures, 10: 2721

## Aluminum crystals

- creep, effect of temperature on, 10: 846
- creep, grain boundary behavior in, 10: 2076
- neutron scattering by phonons in, 10: 1006(J)

## Aluminum fluorides

- conversion to oxide, design of ball kiln for, 10: 3143(R)

## Aluminum foils

- electron energy losses in, 10: 1442(J)

## Aluminum hydroxides

- aging of precipitates, 10: 2009(J)

## Aluminum iodides (liquid)

- solvent properties of, for Al, 10: 62

## Aluminum-iron alloys

- corrosion by Dowtherm A-alkylbenzene mixtures, 10: 3005
- hardness, temperature dependence of, and constitution diagrams, 10: 2090(J)

## Aluminum-iron compacts

- extrusion, 10: 3613

## Aluminum-iron-titanium alloys

- phase studies, 10: 172

## Aluminum isotopes

- relative abundance, 10: 2494(R)

Aluminum isotopes Al<sup>26</sup>

- excited states, determinations, 10: 1411(R)

Aluminum isotopes Al<sup>28</sup>

- beta decay of ground state, 10: 1606(J)
- decay schemes, 10: 3329(R)
- energy levels, possibility of isomeric, 10: 1506(R)

Aluminum isotopes Al<sup>27</sup>

- deuteron reactions (d,n) angular distribution of neutrons, 10: 1570(J)
- gamma radiation from deuteron bombardment of, 10: 1576(J)
- neutron reactions (n,p), cross sections for, 10: 1508(R)

Aluminum isotopes Al<sup>28</sup>

- energy level in the areas of higher excitation, study of, 10: 342(J)

## Aluminum-lithium alloys

- analysis for Li by neutron transmission, 10: 2283

## Aluminum-lithium alloys (liquid)

- reactions with H<sub>2</sub>O, 10: 560

## Aluminum-magnesium alloys

- deformation of polycrystalline, compression and tensile properties, slip, and twins, 10: 2733
- electrodeposition, 10: 3603

## Aluminum-nickel alloys

- hardness, temperature dependence of, and constitution diagrams, 10: 2090(J)
- preparation, physical properties, fabrication, oxidation, and powder metallurgy of modified NiAl, 10: 1391

## Aluminum-nickel-titanium alloys

- preparation and properties, 10: 1391

## Aluminum-nickel-zirconium alloys

- preparation and properties, 10: 1391

## Aluminum nitrates

- conversion to oxide, design of ball kiln for, 10: 3143(R)
- decontamination of acid solutions of, by co-precipitation, 10: 1328
- hydrolysis, 10: 1235

## Aluminum oxide-cobalt systems

- oxidation, 10: 786

## Aluminum oxide films

- determination and formation of, on Al, 10: 2737(J)
- separation from Al, 10: 2737(J)

## Aluminum oxide-magnesium oxide systems

- high-temperature properties and applications, 10: 1345(J)

## Aluminum oxide-nickel systems

- oxidation, 10: 786

## Aluminum oxide-silicon oxide systems

- sorptive properties for boron compounds, 10: 1724

## Aluminum oxide-zirconium oxide systems

- thermal conductivity measurement, 10: 1342(R)

## Aluminum oxides

- absorption of silicon tetrafluoride, 10: 3497
- activated, drying air in, 10: 3018
- cermets of, with Cr-Mo, fabrication, testing, and properties, 10: 1763(J)
- flocculation and streaming potentials in quercus systems, 10: 53
- high-temperature properties and applications, 10: 1345(J)
- precipitation of, from Florida leached zone material, 10: 713(R)
- properties and industrial applications, 10: 1346(J)
- streaming potential studies on, 10: 3189(R)



## Aluminum oxides (cont'd)

streaming potentials and solubility of corundum, 10: 1781(R)

## Aluminum powders

electroplating, 10: 3614

## Aluminum-silicon system-uranium couples

corrosion current density measurements, 10: 887

## Aluminum-silicon systems

static potential measurements, 10: 887

## Aluminum-silicon-zirconium systems

tensile properties of low-impurity, 10: 188(R)

## Aluminum-thorium alloys

corrosion in air and  $H_2O$ , 10: 3598

## Aluminum-tin-zirconium alloys

corrosion by water, 10: 858(R)

## Aluminum-titanium alloys

electrodeposition from hydride-borohydride type baths, 10: 862(R)

preparation and properties, 10: 1391

## Aluminum-titanium-vanadium alloys

notch sensitivity of weld heat affected zones, microstructure, and transformation curves, 10: 1811

## Aluminum-uranium alloys

constitution diagrams, 10: 2441

phase studies, 10: 837(R), 3761

## Aluminum-uranium couples

corrosion current density measurements, 10: 887

## Aluminum-vanadium alloys

analysis for V, 10: 62

spectrophotometric determination of V in, 10: 79

## Aluminum-water systems

fast-group diffusion coefficient for, 10: 1047

## Aluminum-zirconium alloys

electrodeposition from hydride-borohydride type baths, 10: 862(R)

tensile properties for temperature range-195 to 500°C, 10: 188(R)

## American Cyanamid Co. Atomic Energy Div. Raw Materials Development Lab., Winchester, Mass.

progress reports, 10: 2043(R)

progress reports on flotation of U-bearing minerals, 10: 663(R)

## American Cyanamid Co. Atomic Energy Div., Watertown, Mass.

progress reports, 10: 660(R)

## American Electro Metal Corp., Yonkers, N. Y.

progress reports on carbides, nitrides and borides, 10: 559(R), 784(R)

progress reports on high-temperature intermetallic materials, 10: 1392(R)

## Americium

(See also Actinides; Transuranic elements.)

crystal structure, 10: 3104

determination, 10: 3433

determination in fission products, 10: 1230

electrodeposition from acid solutions, 10: 3275

physiological effects and toxicity in rats, 10: 1200

uptake in liver and bone, comparison with other elements. 10: 2241

## Americium-beryllium alloys

neutron yield, measurements, 10: 1914(J)

## Americium isotopes

relative abundance, formed by neutron irradiation of  $Am^{241}$ , 10: 3024Americium isotopes  $Am^{239}$ 

alpha decay properties, 10: 2208(J)

Americium isotopes  $Am^{241}$ 

alpha spectrum, measurement, 10: 336(J)

neutron absorption cross sections, 10: 320(R)

neutron reactions, and formation of Am, Pu, and Cm isotopes from, 10: 3024

as a photon source for gamma-absorption analysis, 10: 3105

spallation and fission, 10: 3104

Americium isotopes  $Am^{242}$ 

isomers, decay properties of, 10: 2206(J)

Americium isotopes  $Am^{243}$ 

alpha-gamma emission, 10: 1729(R)

Americium isotopes  $Am^{244}$ 

electron capture decay, branching ratio, 10: 353(J)

Americium isotopes  $Am^{245}$ formation and  $\beta$ -decay energies and half life, 10: 460(J)

half life and decay scheme, 10: 459(J)

Americium isotopes  $Am^{246}$ 

formation by Pu decay and separation from Pu and fission products, 10: 2042

half life and decay energy, 10: 2210(J)

## Ames Lab., Ames, Iowa

progress reports in engineering, 10: 568(R), 1774(R), 3788(R)

progress reports of Physics Div., 10: 331(R)

progress reports on chemistry, 10: 62(R), 569(R), 570(R), 571(R)

progress reports on metallurgy, 10: 3196(R)

progress reports on physics, 10: 3367(R)

## Amines

protective action against radiation injuries, 10: 1995(J)

## Amino acids

irradiated, paramagnetic resonance, 10: 1308(J)

radiation effects, 10: 2029(J)

## Amino acids, N-trifluoroacetyl-

alkaline hydrolysis, kinetics, 10: 1729(R)

hydrolysis, kinetics of, 10: 582

## Aminopterin

protective effects against radiation injuries in mice, 10: 1161(R)

## Ammonia

chemical reactions with U oxides, 10: 3542

exchange reactions with deuterium, 10: 2306

## Ammonia (liquid)

exchange reactions with hydrogen, 10: 2307

solvent properties for guanidine, urea, and thiourea, 10: 1223(J)

## Ammonia-hydrazine systems

stability, effect of  $KNH_2$  and  $K_2SO_4$  on, 10: 577

## Ammonium fluorides

nuclear magnetic resonances, 10: 2219(J)

## Ammonium hydroxide-uranyl nitrate systems

phase studies of aqueous solutions, 10: 746

## Ammonium nitrates

solubility of uranyl ammonium phosphate in, 10: 3573

in solution, chemical decomposition, 10: 3443

## Ammonium plutonium(IV) fluorides

pyrohydrolytic analysis for total fluoride, 10: 3780

**Ammonium sulfates**

leaching of Florida leached zone material with, 10: 65

**Ammonium uranium fluorides**

pyrohydrolytic analysis for total fluoride, 10: 3780

**Ammonium uranyl phosphates**

solubility in  $\text{HNO}_3$ - $\text{NH}_4\text{NO}_3$  systems, 10: 3574

solubility in nitric acid and ammonium nitrate solutions, 10: 3573

solubility in water, 10: 3555

**Amphibians**

regeneration of x-rayed salamander limbs, cellular transformation during, 10: 521(J)

strontium metabolism in, tracer study, 10: 1718(R)

**Amplifiers**

(See also Electron tubes.)

design, for  $\mu\text{sec}$  neutron pulse measurements, 10: 3159

design and performance, symposium on, for reactor instrumentation, 10: 2467

design of low-noise preamplifier, 10: 3656

design of stable gates, 10: 3144(R)

frequency response of linear, 10: 3622

gain comparator for testing electronic, 10: 3825

**Amylases**

effects of deuteron bombardment on, 10: 31(J)

**Amytal**

(See Barbituric acids.)

**Analogs**

(See Computers; Reactor simulators.)

**Analyzers**

(See Computers.)

**Anemia**

effects of, on potassium transport in erythrocytes, 10: 51(J)

effects of, on sodium and cesium transport in erythrocytes, 10: 52(J)

radioinduced, in laboratory animals, 10: 1160(R)

**Aneth Quadrangle (Colo.)**

photogeologic map of, 10: 162(J)

**Aneth Quadrangle (Utah)**

photogeologic map of, 10: 162(J), 163, 164, 165, 166

**Animal cells**

genetic effects of radiation, 10: 1168(R)

ion exchange properties, 10: 4

morphology, of cricket testes and frog cocytes, 10: 1161(R)

radiation dosage determinations for, 10: 516(R)

radiosensitivity of, factors affecting, 10: 517

uptake of colloids by macrophages in vitro, tracer study, 10: 3100

**Anion exchange materials**

elution behavior of  $\text{Co}^{3+}$ ,  $\text{Cu}^{2+}$ ,  $\text{Zn}^{2+}$ , and  $\text{Mn}^{2+}$ , effect of cross linkage on, 10: 1304(J)

for fission product adsorption, 10: 2327

performance and properties, 10: 2991(R)

performance in separation of cobalticyanide and U, 10: 2689

uranium elution characteristics, 10: 723(R)

**Annealing**

methods for analysis of, theory, 10: 2407

**Anoxia**

effects on radiosensitivity of skin, 10: 1190(J)

influence of, on protective effects of cysteamine and cystamine against radiation injuries in mice, 10: 540(J)

protective effects against radiation injuries in rabbit ears, 10: 1196(J)

protective effects against radiation injuries in yeast, 10: 1193(J)

**Anthracene crystals**

calibration of, for neutron dosimetry, 10: 951

scintillation efficiency, 10: 1471(J)

scintillation response to short range electrons, 10: 976(J)

**Anthraquinone**

synthesis from o-benzoylbenzoic acid, isotope effect in, 10: 1310(J)

**Antibiotic therapy**

radiosensitivity effects of, in mice, 10: 1187(J)

supplemented by vitamins, effects on survival of irradiated dogs, 10: 3255

**Antibodies**

labeled with  $\text{I}^{131}$ , preparation and tissue distribution of, in rats, 10: 545

production of, against tetanus, by thymus and Peyer's patch tissue intra-ocular transplants, 10: 8(J)

**Antigens**

radiosensitivity, 10: 2575

**Antimony**

diffusion in SbZn alloys, 10: 869(J)

effect of impurity, on self-diffusion of Ag, 10: 2747(J)

gamma rays excited by inelastic scattering of 3.7-Mev neutrons in, 10: 3034(R)

inelastic neutron scattering,  $\gamma$  rays excited by, 10: 432(J)

twinning, 10: 868(J)

**Antimony-cesium cathodes**

photoeffects of, sensitized by oxygen, 10: 1844(J)

**Antimony fluoride-bromine fluoride systems**

phase studies, 10: 1261(J)

**Antimony fluorides**

reaction with  $\text{UF}_6$ , 10: 3511

**Antimony-gallium alloys**

conductivity and resistivity, effect of neutron irradiation on, 10: 3035(R)

electrical properties, effects of fast-neutron irradiation on, 10: 2923(J)

**Antimony-indium alloys**

magnetic susceptibility and neutron irradiation, 10: 3035(R)

**Antimony isotopes**

decay, 10: 1111(J)

**Antimony isotopes  $\text{Sb}^{121}$** 

nuclear moments, 10: 2156(J)

**Antimony isotopes  $\text{Sb}^{123}$** 

decay schemes, 10: 3650(R)

**Antimony isotopes  $\text{Sb}^{125}$** 

nuclear moments, 10: 2156(J)

radioactivity, 10: 1601

**Antimony isotopes  $\text{Sb}^{124}$** 

decay schemes, 10: 3650(R)

radioactivity, 10: 3659(R)

**Antimony-manganese alloys**

magnetic structure of, neutron-diffraction analysis, 10: 3144(R)



**Antimony-zinc alloys**

diffusion of Sb in, 10: 869(J)

**Antiprotons**

detection, experimental techniques, 10: 1906(J)

detection and terminal observations, 10: 3222(R)

detection by counter telescopes, 10: 1009(R)

discovery, experimental arrangements, 10: 1510(J)

total H cross section for, and reactions involving, 10: 3854

**APPR**(See Package power reactors.)**Arachnids**

mites infecting mice, identification and control, 10: 1161(R)

**Arc furnaces**(See Electric arc furnaces.)**Archeological specimens**

dating of, by natural radiocarbon measurements, 10: 1104(J)

**Arco Chemical Plant**

analysis for U in process solutions, 10: 1316

fuel processing in, 10: 2170(J)

process gas sampling, 10: 2321

treatment of low-activity wastes in, 10: 115

**Argon**

equation of state, 10: 1445(J)

fluorescence yields, K-series, 10: 1523(J)

formation of  $P^{82}$  from, by cosmic radiation, 10: 2763(J)

high frequency discharge in, probe methods for investigation, 10: 2773(J)

impulse discharge in, from 50 to 110 kev, 10: 226(J)

ionization by  $\alpha$  particles, effects of contamination by other gases on, 10: 2924(J)

neutron cross sections, 10: 3670

pinch effect in electric discharge in, 10: 2774(J)

stripping of singly charged A ions by, 10: 1568(J)

thermal conductivities and accommodation coefficients of, for chrome surfaces at reduced pressures, 10: 2782

**Argon ions**

scattering in gas stripping, 10: 1943(J)

stripping of singly charged, in helium, neon, argon, and krypton at 40 to 180 kev, 10: 1568(J)

**Argon isotopes**

radiation from, effectiveness of stack disposal in removal, 10: 1329

separation by convection diffusion, 10: 2799(J)

separation by flow through a high surface area silica powder pack, 10: 3837

**Argon isotopes  $A^{36}$** 

energy levels, 10: 3329(R)

energy levels, study by inelastic proton scattering, 10: 1506(R)

**Argon isotopes  $A^{37}$** continuous  $\gamma$ -ray spectrum (inner bremsstrahlung), 10: 351(J)

decay, neutrino recoil spectrometer for study of, 10: 1513(J)

decay, spectrum of  $Cl^{37}$  recoils, 10: 320(R)

neutrino emission, recoil spectrum, 10: 2159(J)

**Argon isotopes  $A^{40}$** 

photoprotons from, energy and angular distributions, 10: 1577(J)

ratio of, to  $K^{40}$ , in mica and feldspar, 10: 937(J)**Argonaut Reactor**

design of, a generalized reactor facility for nuclear technology training and research, 10: 3862

**Argonne Heavy Water Reactor**

operation, summary, 10: 3677(R)

reactivity changes from addition of natural U, 10: 3655

**Argonne National Lab., Lemont, Ill.**

environmental radioactivity in 1954, survey, 10: 1992

progress reports of Biology Div., 10: 3408(R)

progress reports of Experimental and Theoretical Nuclear Physics Divisions, 10: 3650(R), 3655(R), 3656(R)

progress reports of Physics Div., 10: 1837(R), 3649(R)

progress reports of Radiological Physics Div. and Biology and Medical Research Div., 10: 3327(R)

progress reports of Reactor Engineering Div., 10: 3677(R)

progress reports of Spectroscopy and Crystal Structure Divisions, 10: 3745(R)

progress reports of the Experimental Nuclear Physics Division, 10: 3651(R), 3652(R), 3653(R), 3654(R)

progress reports on biological research, 10: 1161(R)

progress reports on chemistry, 10: 2256(R)

progress reports on MTR, 10: 2509(R)

progress reports on reactor engineering, 10: 2512(R)

**Argonne reactors**(See specific reactors, e.g., Experimental Breeder Reactor.)**Argonne Research Reactor**control by water expulsion, heat transfer and  $D_2O$  flow in cooling system, 10: 2511

design, 10: 3677(R)

**Arikaree Formation (S. Dak.)**

geology, 10: 1790(J)

**Arizona**

exploration of Chinle Formation in Apache, Coconino, and Navajo counties, 10: 796

exploration of Dripping Spring Quartzite Formation in Gila, Pima, and Pinal Cos. 10: 1353

**Army Package Power Reactor**(See Package power reactors.)**Aromatic compounds**(See Hydroaromatic compounds.)**Arsenic**

gamma rays excited by inelastic scattering of 3.7-Mev neutrons in, 10: 3034(R)

gamma reactions ( $\gamma$ , pn), 10: 62inelastic neutron scattering,  $\gamma$  rays excited by, 10: 432(J)

x-ray fluorimetric determination in stainless steel, 10: 2627

**Arsenic isotopes  $As^{75}$** 

gamma reactions, 10: 571(R)

gamma reactions ( $\gamma$ , 3p, 3n), 10: 569(R)**Arthropods**

laboratory propagation of, 10: 43(R)

**Ascorbic acid**

adrenal levels, effects of irradiation in rats, 10: 1174(J)

effects of Be excretion, 10: 2969(R)

metabolism, 10: 3327(R)

## Ascorbic acid (cont'd)

- radioinduced oxidation, 10: 515(R)
- tissue concentration of, effects of total-body irradiation on, in rats, 10: 523(J)

## Astatine

- metabolism, effects of salivaryectomy and thyroidectomy in rats, tracer study, 10: 1696(R)

Astatine isotopes At<sup>209</sup>

- alpha spectra, 10: 1729(R)

Astatine isotopes At<sup>211</sup>

- effects on reproduction and development in rats, 10: 3165(R)
- incorporation into aromatic compounds, 10: 3143(R)

## Astrophysics

- radiation diffusion, theory and applications of non-steady processes, 10: 2908(J)

## Atkinson Creek Quadrangle (Colo.)

- stratigraphy, ore deposits, and mineralogy, map of, 10: 1360(J)

## Atmosphere

(See also Air; Stack Disposal.)

- radioargon contamination, effect of stack disposal in control of, 10: 1329
- transmission of infrared and visible radiation, 10: 1838

## Atomic beams

- focusing apparatus for, 10: 2104(J)
- magnetic-resonance apparatus, 10: 3144(R)

## Atomic clouds

- sampling of fall out in filters, 10: 1846

## Atomic constants

- values of, systematic errors in, 10: 1419(J)

## Atomic energy

(See also Inspection and Control; Nuclear power.)

- book, 10: 901(J)
- Danish program, 10: 1152(J)
- peaceful uses, conference of S.S.S.R. Academy of Science on, 10: 506
- program in Canada, an address, 10: 505
- public health aspects of peacetime uses, 10: 2596(J)

## Atomic Energy Commission, Washington, D. C.

- Industrial Participation Group Study on the development of nuclear power, summary of results, 10: 2168

## Atomic Energy of Canada Ltd., Chalk River Project, Chalk River, Ont.

- progress reports of Physics Division, 10: 1411(R)

## Atomic explosions

- air activity studies at Corryton, Tenn., and Gainesville, Fla., from 1951 Eniwetok tests, 10: 2246
- blast effects from, on windows, 10: 758
- blast forces from, effects on structure, 10: 782(J)
- fall-out monitoring, at Washington, D. C., from Jan. 1951 to May 1955, 10: 1704

## Atomic masses

- calculation, empirical equation for, 10: 3225

## Atomic models

- equation of state for the Thomas-Fermi-Dirac, 10: 1438
- Thomas-Fermi, extension to molecules of ZZ'<sub>N</sub> type and H<sub>2</sub>O, 10: 2226
- Atomics International Div., North American Aviation, Inc., Canoga Park, Calif.
- progress reports on solid state physics, 10: 3307(R)

## Atoms

(See also Mesic atoms.)

- helium-like, energy level determinations, 10: 1132(J)
- metallurgical aspects of, book, 10: 877(J)
- photoelectric absorption coefficients for K and L shell, calculations, 10: 1836
- scattering, effects of crystal position, 10: 223(J)
- wave functions, review of determinations, 10: 1845(J)

## Auburn Area (Wyo.)

- uranium occurrence, 10: 151

## Australia

- occurrence of uranium deposits in South, 10: 171(J)

## Autunites

- occurrence in the Brule and Chadron Formations in Dawes Co. Nebr., 10: 3192

## Azeotropes

- separation by vapor diffusion, 10: 1334(J)

## B

## Bacteremia

- radioinduced in mice, 10: 1185(J), 1186(J), 1187(J), 3250
- radioinduced in rabbits, 10: 36(J)

## Bacteria

- fermentation in lactic acid, tracer study, 10: 2873(J)
- metabolism in, tracer studies, 10: 3768(J)
- metabolism of mycobacteria, effects of hydrazides of isonicotinic acid and pyruvic acid, 10: 3326(J)
- radioinduced inactivation, 10: 3327(R)
- radiosensitivity of B. subtilis, environmental conditions affecting, 10: 1194(J)
- symbiosis with algae in oxidation ponds, fixation of radioisotopes, 10: 3101

## Bacteriophages

- effects of x and ultraviolet radiation on, 10: 516(R)

## Balances

- micro-, design of quartz fiber, 10: 2650
- micro-, remote controlled quartz-fiber, design, construction, and characteristics, 10: 645

## Ball mills

- design and performance, 10: 1781(R)
- performance, comminution studies, 10: 3189(R)

## Barbituric acids

- n-methyl-phenyl-ethyl-, effects of, on thyroid function in rats, 10: 1(R)

## Barium

- determination, 10: 3433
- determination in Na metal, 10: 1238
- determination in pitchblende gangue, 10: 3447
- electrochemical properties, 10: 3503
- separation from other alkaline earth metals by paper chromatography, 10: 1307(J)
- separation of, by fractional precipitation and by ion exchange, from radium cake leach solutions, 10: 668(R)

## Barium acid phosphates

- identification and crystal structure, 10: 1817

## Barium chloride-sodium chloride systems (liquid)

electric conductivity, viscosity, and density with a simple eutectic,  
10: 3827(J)

## Barium hydrogen phosphates

(See Barium acid phosphates.)

## Barium iodides

preparation, in non-aqueous systems, 10: 58

## Barium isotopes

electromagnetic separation, 10: 3026(R)

radiometric determination of, in urine, 10: 612

Barium isotopes Ba<sup>134</sup>

angular correlation of 1367 to 605 kev  $\gamma$ - $\gamma$  cascade, 10: 348(J)

gamma decay, 10: 446(J)

Barium isotopes Ba<sup>135</sup>

nuclear magnetic resonance, 10: 3026(R)

Barium isotopes Ba<sup>137</sup>

isomeric states, production by inelastic neutron scattering, 10: 2190(J)

nuclear isomerism, decay scheme, and coefficients of internal conversion  
electrons, 10: 472(J)

nuclear magnetic resonance, 10: 3026(R)

Barium isotopes Ba<sup>139</sup>

energy levels, 10: 2150(J)

Barium isotopes Ba<sup>140</sup>

formation cross section from deuteron bombardment of U, 10: 2239(J)

formation cross sections of, from U<sup>238</sup> bombarded with 19- to 190-Mev  
deuterons, 10: 2237

relative fission yields from pile-neutron-fission of natural U, 10: 500

## Barium Lode Claim (Colo.)

radioactivity, 10: 1352

## Barium nitrates

spectrographic analysis for Ca, Na, and Sr, 10: 1234

## Barium sulfates

radioactive dusts of, pulmonary effects in rats, 10: 1698(J)

## Barium titanate crystals

ferroelectric properties, 10: 2752(R)

## Barium titanates

crystal structure, 10: 1729(R)

## Barley

radiosensitivity of seeds of, effects of hydration, 10: 1195(J)

## Bartol Research Foundation, Philadelphia

progress reports on neutron scattering, 10: 3034(R)

## Battelle Memorial Inst., Columbus, Ohio.

progress reports, 10: 825(R)

progress reports on effect of grain size on mechanical properties of Ti  
and Ti alloys, 10: 1394(R)

progress reports on H in Ti alloys, 10: 844(R)

progress reports on nonaqueous extraction methods for U, 10: 672(R)

progress reports on separation of Zr and Hf, 10: 3787

progress reports on U extraction, 10: 674(R)

progress reports on U extractive methods for U ores, 10: 669(R),  
670(R), 671(R), 673(R), 675(R)

progress reports on U metallurgy, 10: 3609(R)

progress reports on U recovery from Chattanooga shales, 10: 2999(R)

## Beams

(See Alpha beams; Atomic beams; Carbon ion beams; Charged particle  
beams; Deuteron beams; Electron beams; Ion beams; Molecular  
beams; Neutron beams; Proton beams.)

## Bearing materials

lubrication, performance, and wear resistance, 10: 2405

water lubrication, testing, 10: 3188(R)

wear resistance in abrasive solutions, testing, 10: 3354(R)

wear resistance in liquid Na, 10: 2092

## Bearings

design, sleeve bearing, 10: 2405

lubrication of high-speed anti-friction, 10: 1780(R)

magnetic thrust, design, 10: 2400

water-lubricated, evaluation, 10: 3188(R)

wear resistance in abrasive solutions, testing, 10: 3354(R)

## Beatty Area (Nev.)

geophysical exploration, 10: 1784

## Behavior

chemical factors, 10: 2571

conditioned response of rats to  $\gamma$  irradiation, 10: 22

effects of exposure to mild doses of radiation administered over a long  
period of time on, in monkeys, 10: 520(J)

radiation effects on, in monkeys, 10: 1166

## Bellows

(See also Valves.)

temperature and radiation effects on, 10: 781

testing for SIR sodium valves, 10: 120(R)

## Beneficiation

(See Mechanical beneficiation.)

## Benzene

chlorination, effect of  $\gamma$  radiation, 10: 2025

infrared spectra, 10: 1817

luminescence of mixtures of, produced by Co<sup>60</sup>  $\gamma$  rays, 10: 1600(J)

preparation of C<sup>14</sup>-labeled, 10: 1758(J)

solvent properties for TTA, 10: 3566

## Benzene, chloro-

chlorination, effect of  $\gamma$  radiation, 10: 2025

## Benzene, p-dichloro-

nuclear quadrupole resonance, effect of gamma irradiation on,  
10: 1012(J)

## Benzene, fluoro-

neutron-irradiation, chemical state of F<sup>18</sup> formed during, 10: 637(J)

## Benzene-methanol systems

thermodynamic properties, 10: 1334(J)

## Benzene, nitro- complexes

with aromatic compounds, infrared spectra, 10: 3048

## Benzenes

reactions with Br<sup>80</sup>, hot-atom chemistry, 10: 2030(J)

## Benzenes, alkyl-

corrosive effects on construction metals, 10: 3005

## Benzoic acid (labeled)

preparation, 10: 3167

## Benzoic acid, o-benzoyl-

condensation to anthraquinone, isotope effect in, 10: 1310(J)

## Benzoyl peroxide

thermal decomposition, 10: 3329(R)

## Beryllia

(See Beryllium oxides.)



**Beryllium**

- analysis for trace quantities of boron, 10: 2296
- bremsstrahlung differential cross section of, for 0.5- and 1.0-Mev electrons, 10: 2780(J)
- chemical analysis for BeO, 10: 1231
- chemical properties, 10: 2969(R)
- cladding with Monel, Inconel, Armco iron, Ti, and Zr, 10: 3009
- danger coefficient measurements, 10: 3379(R)
- electrodeposition from fused-salt baths, 10: 1367
- electroplating, 10: 3812
- electroplating, pre-surface treatment, 10: 3065(P)
- extrusion and tensile properties, 10: 837(R)
- extrusion into rods and tubing, 10: 1817
- fabrication and production, 10: 1817
- fabrication methods and oxidation studies, 10: 836(R)
- gamma activity induced in, by reactor radiation, 10: 3678
- gamma reactions ( $\gamma, n$ ), cross sections for, 10: 3650(R)
- gamma reactions ( $\gamma, n$ ), threshold for, 10: 3656
- geochemistry, occurrence in minerals and rocks, 10: 1817
- $\pi^-$  meson interactions, 10: 274(J)
- metallurgy, powder metallurgy, and production, 10: 2446
- neutron diffusion length and age in, 10: 3650(R)
- neutron resonance determination by scattered neutrons, 10: 3649(R)
- pathological effects following pulmonary absorption, 10: 2969(R)
- pathological effects of skin implants in swine, 10: 3257
- photoneutron yields from, from Sb<sup>124</sup> and La<sup>140</sup>  $\gamma$  rays, 10: 3732
- photoneutron yield from U<sup>235</sup> fission products in, 10: 2859(J)
- photoneutrons produced in, energy and angular distributions of, 10: 1899(J)
- polishing for electroplating, 10: 3812
- production by reduction of BeF<sub>2</sub>, 10: 1817
- proton scattering, asymmetries in neutron and proton production, 10: 1939
- protons elastically scattered from, polarization of, 10: 1593(J)
- purification by distillation, 10: 1754
- sensitization following administration to pigs, 10: 3097
- separation from Ge, In, and Ga by paper chromatography, 10: 1246(J)
- separation from other alkaline earth metals by paper chromatography, 10: 1307(J)
- toxic effects of, in guinea pigs, 10: 550(J), 551(R)

**Beryllium (clad)**

- corrosion in 600°F water and 932°F sodium, 10: 3812

**Beryllium alloys**

(See also Americium-beryllium alloys.)

- corrosion by distilled and borated deionized H<sub>2</sub>O at temperatures up to 500°F, 10: 3006
- corrosion by Dowtherm A-alkylbenzene mixtures, 10: 3005

**Beryllium-amerium alloys**

- neutron yield, measurements, 10: 1914(J)

**Beryllium borohydrides**

- preparation, 10: 3603

**Beryllium carbides**

- preparation and chemical analysis, 10: 3590

**Beryllium chlorides**

- electrical conductivity of BeCl<sub>2</sub>-NaCl system, 10: 593(J)

**Beryllium-chromium alloys**

- crystal structure of CrBe<sub>12</sub>, 10: 911(J)

**Beryllium compounds**

- colorimetric analysis for Fe, 10: 3429

**Beryllium-copper alloys**

- precipitation-hardening reaction in, effects of neutron irradiation on, 10: 2919(J)
- tensile properties, 10: 836(R)

**Beryllium-copper compacts**

- mechanical properties and sintering, 10: 3614

**Beryllium crystals**

- preparation of single, 10: 836(R)

**Beryllium fluorides**

- reduction for production of Be, 10: 1817
- vapor pressure, boiling and melting points, 10: 3336

**Beryllium foils**

- preparation of very thin, for linear accelerator drift tube, 10: 2451

**Beryllium iodides**

- decomposition for production of Be, 10: 2446

**Beryllium isotopes Be<sup>7</sup>**

- energy levels, 10: 2496
- formation from O reaction, 10: 2469
- inner bremsstrahlung- $\gamma$ -ray directional angular correlation, 10: 320(R)
- preparation of, by Li<sup>7</sup>(d,2n) Be<sup>7</sup> reaction, and purification, 10: 1452

**Beryllium isotopes Be<sup>8</sup>**

- energy levels, 10: 2176(J), 3144(R)
- excited state, determination of spin and parity from B<sup>11</sup>(p, $\alpha$ ) reaction, 10: 357(J)
- excited state of, in reaction C<sup>12</sup>( $\gamma, \alpha$ ) Be<sup>8</sup>, 10: 1910(J)
- neutron energy spectrum from Li<sup>7</sup>(d,n) Be<sup>8</sup> reaction, and energy levels in, 10: 314(J)

**Beryllium isotopes Be<sup>9</sup>**

- alpha reactions ( $\alpha, n$ ), and production of Ra-Be neutron sources, 10: 2490
- cross section for F<sup>18</sup> production by N bombardment, 10: 403(J)
- deuteron absolute cross sections, 10: 1578(J)
- gamma radiation from Be<sup>9</sup>( $\alpha, n$ ) C<sup>12</sup> reaction, 10: 1575(J)
- helium nucleus reaction (He<sup>3</sup>, p), proton angular distributions, 10: 405(J)
- levels, 10: 1525(J)
- neutron reactions (n, $\alpha$ ), cross sections for, 10: 3144(R)
- neutron yield from deuteron reactions, 10: 1915(J)
- nuclear reactions ( $\alpha, n$ ), angular distribution of  $\gamma$  rays from, 10: 2902(J)
- nuclear reaction (He<sup>3</sup>, p) B<sup>11</sup>, angular distributions, 10: 1507(R)
- proton reaction (p,n), counter ratio, neutron yield, neutron thresholds, and cross section, 10: 398(J)
- proton reactions (p, $\gamma$ ), gamma yields from, 10: 3144(R)
- proton reactions (p,p') and (p,pn), magnetic analysis of energy distribution of protons from, 10: 401(J)
- decay studies, 10: 3652(R)

**Beryllium isotopes Be<sup>10</sup>**

- half life determination, 10: 3652(R)

**Beryllium lattices**

(See Beryllium moderated reactors.)

**Beryllium-magnesium alloys**

- electrodeposition, 10: 3603

**Beryllium minerals**

occurrence, 10: 1817

**Beryllium moderated reactors**reactivity changes caused by H<sub>2</sub>O condensation in, 10: 3707**Beryllium-molybdenum alloys**crystal structure of MoBe<sub>12</sub>, 10: 1851(J)**Beryllium-nickel alloys**

precipitation hardening of neutron-irradiated, 10: 3035(R)

precipitation-hardening reaction in, effects of neutron irradiation on, 10: 2919(J)

tensile properties, 10: 836(R)

**Beryllium-niobium alloys**crystal structure of NbBe<sub>12</sub>, 10: 911(J)**Beryllium nitrides**thermal conductivity of Be<sub>3</sub>N<sub>2</sub>, 10: 3641**Beryllium oxide-uranium(IV) oxide systems**

thermal conductivity, 10: 3616

**Beryllium oxides**

analysis for trace quantities of boron, 10: 2296

chemical determination, 10: 2384

chemical determination in Be metal, 10: 1231

high-temperature properties and applications, 10: 1345(J)

neutron total cross sections, 10: 3650(R)

production, 10: 2446

refractory properties, 10: 2408(R), 2409(R), 2410(R), 2411(R), 2412(R), 2413(R), 2414(R), 2415(R), 2416(R), 2417(R), 2418(R), 2419(R), 2420(R)

thermal conductivity, density, porosity, and other physical properties, 10: 3672

volatilization in steam, 10: 3591

**Beryllium oxides (impregnated)**

with uranium(VI) oxides, fabrication, 10: 3672

**Beryllium powders**

electroplating with Cu, 10: 3614

**Beryllium-thorium alloys**corrosion in air and H<sub>2</sub>O, 10: 3598**Beryllium-uranium alloys (clad)**

production, 10: 2446

**Beryllium-vanadium alloys**crystal structure of VBe<sub>12</sub>, 10: 911(J)**Beryllium-water systems**

neutron age, 10: 2139

**Bessel functions**

representations for numerical evaluation on computers, 10: 241

**Beta decay**beta- $\gamma$  directional correlation formulas, 10: 1968(J)in C<sup>14</sup>-labeled ethane, chemical effects, 10: 2652(J)

double, theoretical expectations for, 10: 3160

double, theory, 10: 475(J)

of helium (He<sup>6</sup>) and shell models with intermediate coupling, 10: 328(J)

molecular excitation and dissociation following, 10: 2653(J)

nuclear structure, relation to, 10: 1011(J)

selection rules for strongly deformed nuclei, 10: 366(J)

**Beta particles**(See also Electrons; Positrons.)**Beta particles (cont'd)**

absorption and backscattering, 10: 977(J)

angular distribution, 10: 2781(J)

counting with GM tubes, factors affecting, 10: 1462

detection and measurement, by photographic methods, temperature effects on, 10: 2482

detection and measurement, design of pulse analyzer for, in presence of  $\alpha$  particles, 10: 1674(P)

detection and measurement, design of rate meter for, 10: 249

detection and measurement, portable scintillation counter for, 10: 3080(P)

detection and measurement, scintillation detector for, 10: 3031

detection and measurement in the presence of  $\gamma$  radiation, by single crystal summation technique employing scintillation counter equipment, 10: 1473(J)

detection and measurement in uranyl nitrate solutions, 10: 2375

detection and measurement of, from U<sup>237</sup>, 10: 3640

detection and measurement of, performance of ionization chambers for, 10: 516(R)

detection by x-ray and photographic films, 10: 1479(J)

dosage determinations, 10: 2604(J), 3030

dosage determinations, design of ionization chamber for, 10: 2813

dosimetry in tissue, 10: 2838(J)

effects of exposure to, on hatchability of eggs of *Habrobracon*, 10: 35(J)

measurement of weak activities of, with proportional counters, 10: 1885(J)

monitoring, design of multi-range instrument for, 10: 3843

monitoring in liquid waste streams, automation for, 10: 3125

neutron decay by, and angular correlation with neutrino, 10: 1500(J)

pathological effects in mice, 10: 3327(R)

pathological effects of, on laboratory animals and plants, 10: 513(R)

from radiophosphorus, effects on ovarian tissue in rats, 10: 1702(J)

from Ru<sup>106</sup> plaques, effects on skin of swine and rabbits, 10: 3409(R)from sulfur<sup>35</sup>, W value of air, 10: 2840(J)

from thorium, dosage determinations, 10: 2811

from tritiated water, counting at high humidities in the Geiger region, 10: 2823(J), 2824(J)

from tritium, detection and measurement, 10: 3104

**Beta sources**calibration of Sr<sup>90</sup>, 10: 956standard C<sup>14</sup>, preparation, 10: 2831(J)**Beta spectrometers**

design and mathematical analysis of electrostatic, with double retarding field, 10: 1467

design of high-transmission coincidence, 10: 968(J)

design of Fe-free, 10: 1411(R)

development of homogeneous field ring focusing, 10: 3851(R)

electron trajectories in electrostatic, with double retarding field, 10: 1467

high resolution magnetic field, design, 10: 262(J)

magnetic, design, 10: 2488

resolution, improvement of, 10: 2822(J)

semi-circular, for  $\beta$ - $\gamma$  coincidence measurements, 10: 2835(J)**Betatrons**

applications in nuclear physics, 10: 1937(J)

bremsstrahlung spectrum from internal target of 22 Mev, 10: 2182(J)

dosage determinations, 10: 2001(J)

energy stability of Univ. of Illinois 22-Mev, 10: 420(J)

## Betatrons (cont'd)

tissue dosage determinations on x rays from, 10: 2602(J)

## Bevatron

development and operations report, 10: 3239(R)

development work on, improvements in auxiliaries and experimental facilities, and fast neutron flux from, 10: 2181(R)

operation and development, 10: 1081(R)

## Bibliographies

of particle accelerators, 10: 1585

on unclassified bibliographies of interest to the AEC, 10: 502

on vacuum sparking, 10: 912

## Biochemistry

gas counting techniques and applications in, 10: 1875(J)

## Biological materials

radiometric and radioautographic determinations of  $\text{Po}^{210}$  in, 10: 614

staining, for photography, 10: 1979(J)

## Biological systems

behavior, mathematical analysis, 10: 1161(R)

radiation effects, factors affecting measurements, 10: 2586(J)

thermodynamics of irreversible phenomena in, 10: 6(J)

## Biology conferences

on basic mechanisms in radiobiology, held at Highland Park, Ill., 1954, 10: 39(J)

on mutation, 10: 3093

report on radiotherapy at international congress on radiology at Copenhagen, 1953, 10: 46(J)

## Biometry

equations for estimation of concentration of  $\text{H}_2\text{O}_2$  within a nucleus, 10: 1181(J)

kinematic equations in studies of cellular behavior, 10: 1161(R)

## Biphenyl moderated reactors

(See Organic moderated reactors.)

## Biphenyl-phenyl ether systems

corrosive effects on construction metals, 10: 3005

evaluation as a reactor coolant, 10: 2897

## Bird Spring Formation (Nev.)

geology, 10: 1358

## Birds

lethal radiation dosage determinations on pigeons, 10: 3327(R)

## Bismuth

ductility, creep, and impact properties, 10: 841

electrodeposition on Al and Ni, 10: 3815

fission cross sections for 460- and 600-Mev protons, 10: 1071(J)

gravimetric determination in Bi-Pu alloys, 10: 2352

meson ( $\pi^-$ ) capture by, fission and star formation from, 10: 275(J)

neutron absorption cross section, 10: 3649(R)

neutron elastic scattering cross sections, 10: 1088

neutron resonances, 10: 3144(R)

neutron scattering by, angular distribution and polarization, 10: 1901(J)

neutron total cross sections, comparison of measured and calculated values, 10: 2146

slow neutron transmission measurements, resonance parameters, 10: 316(J)

surface effects on nuclear reactions, 10: 1411(R)

twinning, 10: 868(J)

## Bismuth (liquid)

solvent properties for rare earths, analysis, 10: 3786

solvent properties for U at 500°C, magnesium effects on, 10: 3345

solvent properties on Zr, 10: 2440(R)

## Bismuth-cesium alloys

superconductivity, 10: 197(J)

## Bismuth-cesium cathodes

photoeffects of, sensitized by oxygen, 10: 1844(J)

## Bismuth fluoride-bismuth oxide systems

crystal lattice dimensions, 10: 3745(R)

crystal structure of  $\text{BiO}_{0.1}\text{F}_{1.9}$ , 10: 1259(J)

phase studies, 10: 1258(J)

## Bismuth fluorides

crystal lattice dimensions, 10: 3745(R)

crystal structure and thermal decomposition, 10: 1258(J)

Bismuth isotopes  $\text{Bi}^{203}$ 

decay schemes, 10: 1729(R)

Bismuth isotopes  $\text{Bi}^{204}$ 

decay schemes, 10: 1729(R)

Bismuth isotopes  $\text{Bi}^{208}$ 

decay schemes, 10: 1729(R)

Bismuth isotopes  $\text{Bi}^{208}$ 

isomeric transition, 10: 473(J)

Bismuth isotopes  $\text{Bi}^{209}$ 

proton reaction ( $p,\gamma$ ) cross sections, 10: 402(J)

proton reactions ( $p,n$ ), cross sections, error in, 10: 1411(R)

Bismuth isotopes  $\text{Bi}^{210}$ 

separation from  $\text{Pb}^{210}$  and  $\text{Po}^{210}$  by ion exchange, 10: 2798(J)

Bismuth isotopes  $\text{Bi}^{212}$ 

decay scheme, 10: 2938(J)

separation from Th in aqueous  $\text{Cl}^-$  and  $\text{NO}_3^-$  solutions by electrodeposition, 10: 1306(J)

spectrum, 10: 1543(J)

Bismuth isotopes  $\text{Bi}^{214}$ 

decay scheme, 10: 448(J)

gamma and beta spectra, 10: 1610(J)

## Bismuth-lead alloys

electric and thermal conductivities above and below room temperature, 10: 2724

electric and thermal conductivity at elevated temperatures, 10: 181

## Bismuth-nickel alloys

constitution diagram and microstructure, 10: 3815

## Bismuth oxide-bismuth fluoride systems

crystal lattice dimensions, 10: 3745(R)

crystal structure of  $\text{BiO}_{0.1}\text{F}_{1.9}$ , 10: 1259(J)

phase studies, 10: 1258(J)

## Bismuth oxyfluorides

crystal lattice dimensions, 10: 3745(R)

## Bismuth Phosphate Process

waste disposal, 10: 2398

## Bismuth phosphates

crystalline phase, x-ray study of, 10: 3618

## Bismuth-plutonium alloys

analysis for Bi, 10: 2352



Bismuth—rubidium alloys

superconductivity, 10: 197(J)

Bismuth—uranium alloys

microstructure and phase equilibria, 10: 3761

phase studies, 10: 837(R)

Bismuth—uranium alloys (liquid)

corrosive effects on stainless steel and Croloy, with and without Mg and Zr additions, 10: 2440(R)

corrosive effects on Ta loops, 10: 1774(R)

fission-product decontamination by fused-salt extraction, 10: 3786

Black Hills (S. Dak.)

exploration, geology, and U and V occurrence, 10: 1789(J)

geologic investigations for radioactive deposits in, 10: 2067(R)

Blood

radiometric analysis of, for  $\alpha$  emitters, 10: 606

spectrophotometric analysis of, for cholesterol, 10: 11

Blood circulation

in perfused hindlegs of cats, 10: 1980(J)

Blood picture

effects of radiation on, 10: 1707(J)

effects of whole-body x irradiation on, in monkeys, 10: 530(J)

in patients relieving whole blood transfusions, 10: 9(J)

radiosensitivity in domestic animals, 10: 3769(R)

radiosensitivity of rat, guinea pig, rabbit, mouse, human, and goat, 10: 3408(R)

Blood plasma

amino acid content of, effects of irradiation on, in rats, 10: 536(R)

anemic, effects on erythropoiesis when injected into irradiated and normal rabbits and rats, 10: 3767

iron levels in, in beagle dogs, 10: 1160(R)

lipoprotein fractions in, influence of developmental stage in chick embryos, 10: 1153

proteins of, radiosensitivity, 10: 2575

radiosensitivity of electrophoretic pattern in goats and humans, 10: 3408(R)

Blood serum

electrophoretic determination of labeled chromium chloride and sodium chromate in, in rats, 10: 83

immunochemical and physiochemical factors, effects of radiation in rats, 10: 2576

Blood transfusions

hemorrhagic disorders following massive, 10: 9(J)

Blood vessels

abnormal subclavian artery, displacement of esophagus by, 10: 1978(J)

Blood volume

measurement, 10: 3165(R)

Blue House Mountain Quadrangle (Ariz.)

map of, radiometric observations of Cherry Creek to Canyon Creek and Salt River Canyon and Cassadero Springs in, 10: 1353

Bob Cat Mine (Colo.)

mineralogy, 10: 1352

Bodies

(See Antibodies; Ceramic bodies.)

Body fluids

(See also specific body fluids; e.g. Blood; Body water.)

flow of perfusion fluids through the isolated rabbit's ear, effects of x irradiation on, 10: 529(J)

Body volume

human, apparatus for measuring, 10: 2572

Body water

determination in sheep, tracer study, 10: 3789(R)

tissue retention of, effects of total-body irradiation on, in dogs, 10: 28(J)

Boilers

(See also Water boiler neutron sources.)

design and testing of 3-megawatt, 10: 1775(R)

leak plugging studies for SIR, 10: 120(R)

testing of 3000-kw, for SIR, 10: 120(R)

water circulation in natural circulation, 10: 765(J)

Boiling

bubble formation, heat transfer in, 10: 2698(J)

bubble formation and growth, mathematical analysis, 10: 760

density transients, measurement and prediction, 10: 2054

effects of gas evolution on surface, 10: 772(J)

film formation, MTR operation in the region of, 10: 3401

heat transfer with liquid metals, 10: 772(J)

nucleate, surface variable measurements, 10: 772(J)

in pipes, theory of heat exchange on, 10: 1338(J)

pressure effects on steam—water density and flow rate in natural circulation, 10: 3352

stable film, of liquid O<sub>2</sub> outside single horizontal tubes and wires, 10: 772(J)

Bonding

surface treatment of stainless steel, Al, and Mg for, 10: 191

Bonds

analysis of metal—oxygen, in U, Np, Pu, and Am sodium acetate complexes 10: 994

Bone marrow

homogenates, effects on hemolysin production in irradiated mice, 10: 522(J)

implantation of functional elements from, effects on recovery from radiation injuries in rats, 10: 1997(J)

injections, viability and protective effects against radiation injuries, 10: 537

nuclei acids of, effects of radiation administered as single or divided dose in rats, 10: 1184(J)

radiosensitivity effects of injected in mice, 10: 3768(J)

therapeutic effects of injected, against radiation injuries in mice and rats, 10: 1189

Bone tumors

radioinduced following injection of Ac<sup>227</sup> into mice and rats, 10: 2966

Bones

(See also Skeleton.)

calcium and Sr deposition in, effects of diet, in experimental animals, 10: 2973

determination of specific activity of Na in, 10: 623(J)

effects on depth-dose curves of high-energy x rays and electron beams, 10: 2842(J)

embedding, for radioautographs, 10: 1161(R)

radioautographic analysis, 10: 1160(R)

spectrographic analysis, 10: 43(R)

Boral

(See Aluminum—boron carbide systems.)

Boranes

(See Boron hydrides.)

## Borax

(See also Sodium tetraborates.)

effect on corrosion of Cu in  $H_2O$ , 10: 2704

## Boric acid systems

radiolysis of aqueous solutions containing  $CdSO_4$ , 10: 3784

## Borides

(See also Zirconium borides.)

powder extrusion of high melting point metals, 10: 1407(J)

## Borine, trimethyl-

purification techniques, 10: 1837(R)

sorption on charcoal and Pd black, 10: 1724

## Borines

oxidation of  $B(CH_3)_3$ , kinetics, 10: 1210

preparation, properties, and chemical reactions, 10: 1214(R)

synthesis and properties of alkenyl, 10: 1725

## Borines, methylamino-

crystal structure of the dimer, 10: 1216

## Borohydrides

(See also specific borohydrides, e.g., Aluminum borohydrides;  
Beryllium borohydrides.)

preparation of U, Al, Li, Na, and Na trimethoxy-, 10: 3498

thermodynamic properties from 25 to 2000°K, 10: 1721

## Boron

absorption of radiation, numerical calculation, 10: 1085

assay by volumetric techniques, 10: 81(R)

chemical analysis, 10: 3421

colorimetric determination in Be and BeO, 10: 2296

criticality effects in  $H_2O$ -moderated lattices, 10: 3145

crystal structure, 10: 1216

determination in NaOH and  $Na_2CO_3$ , 10: 2272(R)

determination in  $ZrH_4$  and  $ZrO_2$ , 10: 2736

determination of, in U concentrates, 10: 660(R)

isotopic analysis on mass spectrometer, improved techniques for,  
10: 3176

neutron attenuation in, 10: 1504(J)

neutron attenuation in, efficiency, 10: 2492

neutron cross sections, 10: 2550

production, by reduction of boron halides, 10: 2249

separation and determination in aqueous solutions, 10: 621(J)

spectrochemical determination of trace amounts in carbon and graphite,  
10: 617(J)

thermodynamic properties from 25 to 2000°K, 10: 1721

toxicity of, in mice, 10: 1(R)

toxicity of, when intravenously injected, 10: 49(J)

## Boron carbide-aluminum systems

composition analysis at LTSE, 10: 3325

## Boron carbide-silicon carbide-titanium carbide systems

density and oxidation resistance, 10: 788

## Boron carbides

(See also Aluminum-boron carbide systems.)

neutron and  $\gamma$  attenuation in  $B_4C$  and borated  $H_2O$  shield, 10: 3676

neutron irradiation effects and burn-up of, and possible use in reactor  
control systems, 10: 1599

preparation of ceramic materials, 10: 3064(P)

## Boron carbides (cont'd)

shielding properties, and neutron and  $\gamma$  attenuation in Fe,  $B_4C$ , and  
borated  $H_2O$  systems, 10: 3742

## Boron chambers

(See Boron coatings.)

## Boron chlorides

analysis for constituents and impurities, 10: 3420

heat of formation, 10: 2342

reduction, 10: 2249

## Boron-chromium-iron-nickel systems

reactor safety rods of, stability, and mechanical and magnetic properties,  
10: 1552

tensile and impact test results on irradiated, 10: 1823

## Boron coatings

fabrication and properties for radiation detection instruments, 10: 2467

## Boron compounds

chemical and physical properties of alkoxyboroxines and alkylidihalo-  
boranes, 10: 1723

electrolytic reduction of alkylidifluoroboranes in nonaqueous solvents,  
10: 1723

physical properties and chemical reactions, 10: 2613(R)

preparation and properties of boronamide polymers, 10: 1219(R)

preparation and structure of ammonia-borane,  $H_3BNH_3$ , 10: 1225(J)

with Si, synthesis, 10: 1212

thermodynamic properties from 25 to 2000°K, 10: 1721

## Boron fluorides

chemical determination in  $BCl_3$ , 10: 3420

heat of formation, 10: 2342

reactions with triphenylsilylpotassium, 10: 1212

reduction, 10: 2249

## Boron hydrides

adsorption of  $B_2H_6$  on boron nitride and Pd on charcoal, 10: 2624(J)

detection in air, 10: 2611

flammability limits of  $B_2H_6$  in  $CO_2$ -air mixtures, 10: 2612

neutron attenuation in, efficiency, 10: 2492

oxidation of  $B_2H_6$  in air, 10: 59

physical properties and chemical reactions, 10: 2613(R)

preparation of diborane, 10: 3498

pyrolysis, oxidation, hydrolysis, and ethenolysis, reaction kinetics,  
10: 1210

pyrolysis of  $B_2H_6$ , equipment for, 10: 1722

pyrolysis of  $B_2H_6$ , effect of surface-active agents on, 10: 1724

reactions of  $B_2H_6$  with ethylenimine and azetidine, 10: 1214(R)

sorption of  $H_2H_3$  and D-labeled  $B_2H_6$  on charcoal, Pd black, and silica-  
alumina, 10: 1724

synthesis of  $B_2H_6$ , 10: 573

thermodynamic properties from 25 to 2000°K, 10: 1721

thermodynamic properties of decaborane ( $B_{10}H_{12}$ ), 10: 2013(J)

## Boron isotopes

nuclear reactions (d,n), thresholds and cross sections for, 10: 1579(J)

Boron isotopes  $B^{10}$ 

deuteron reactions (d, $\gamma$ ), energy analysis, 10: 1832(J)

energy level transitions in, lifetimes of, 10: 3144(R)

isotopic abundance, determination by neutron activation, 10: 2796(J)

Boron isotopes B<sup>10</sup> (cont'd)

- neutron and  $\gamma$ -ray yields from bombardment by protons with energies up to 5 Mev, 10: 346(J)
- neutron capture by, energy levels, 10: 2968

Boron isotopes B<sup>11</sup>

- energy level in the areas of higher excitation, study of, 10: 342(J)
- energy level transitions in, lifetimes of, 10: 3144(R)
- energy levels, p- $\gamma$  angular correlation of 2.14-Mev, 10: 2820(J)
- neutron and  $\gamma$ -ray yields from bombardment by protons with energies up to 5 Mev, 10: 346(J)
- proton reaction (p,n) cross section, 10: 398(J)
- proton reactions (p, $\alpha$ ), angular correlation between  $\alpha$  particles, 10: 357(J)

Boron isotopes B<sup>12</sup>

- energy level in the areas of higher excitation, study of, 10: 342(J)
- gamma emission and half life of U<sup>235</sup> fission product, 10: 3764

## Boron nitrides

- adsorptive properties for B<sub>2</sub>H<sub>6</sub>, 10: 2624(J)
- refractory properties of hot-pressed, 10: 1344(J)

## Boron oxides (liquid)

- physical and solvent properties, from 500 to 800°C, 10: 1211(J)

## Boron polymers

- synthesis of boronamides, 10: 1219(R)

## Boron-stainless steel systems

- (See Boron-chromium-iron-nickel systems.)

## Boron steel

- bainite transformation in, x-ray-diffraction analysis, 10: 850
- production, 10: 1817

## Boron, trimethyl-

- (See Borine, trimethyl-)

~~Borons~~

- lectures on, by B. Rossi, 10: 324(J)

~~Bosons~~

- (See also Elementary particles.)

- fermion field interaction, 10: 1140(J)
- heavy unstable, existence of degenerate charged states of, 10: 1141(J)

## Boss Mine (Nev.)

- mineralogy, 10: 1358

## Boundary layer

- determination of, in two phase heat conducting media in its stable thermal state, 10: 2808(J)
- in noncompressible liquid on porous diaphragm, turbulent, 10: 1340(J)
- transition from laminar to turbulent flow in, 10: 140(J)
- turbulent, calculations in presence of heat transfer, 10: 2694(J)

~~Brain~~

- blood-brain barrier disturbances, tracer studies, 10: 3776
- cerebellar response in, effects of acute x irradiation in cats, 10: 1179(J)

## Brain tumors

- diagnosis by isotope encephalometry, 10: 2005(R)

## Brass

- (See also Copper alloys.)

- electric conductivity and Hall coefficients of  $\alpha$ - and  $\beta$ -, 10: 1404(J)
- electron and positron transmission in, 10: 1441(J)

## Brass (cont'd)

- grain size determination by ultrasonic methods, 10: 854
- plastic deformation of, effects of annealing on, 10: 184(R)
- resistivity changes in neutron-irradiated, 10: 3035(R)

## Brass crystals

- resistivity changes in neutron-irradiated, 10: 3035(R)

## Brazed joints

- tensile strength of stainless steel, 10: 2071

## Brazing alloys

- evaluation for joining stainless steel and Inconel fins, 10: 864
- properties of Li-bearing, 10: 880(J)

## Bremsstrahlung

- of alpha particles, deviation from additive law in, 10: 1904(J)
- from chromium Cr<sup>51</sup>, spectrum, 10: 1604(J)
- cross section in nuclear emulsions, 10: 1443(J)
- differential cross sections of Be, Al, and Au for 0.5- and 1.0-Mev electrons, 10: 2780(J)
- of germanium isotopes Ge<sup>71</sup>, 10: 447(J)
- spectra in Fe and Mo from absorption of Li<sup>6</sup> electrons, calculations, 10: 3404
- spectrum from 500-Mev electrons, 10: 1439(J)
- spectrum from internal target of a 22-Mev betatron, 10: 2182(J)
- of sulfur isotopes S<sup>36</sup>, 10: 477(J)

## Bridgeport Brass Co., Conn.

- progress reports on fabrication of Zr shells, 10: 3013(R), 3362(R)

## Brigham Group (Ariz.)

- geology, 10: 796

## Brittleness

- (See Ductility.)

## Bromides

- (See also specific bromides.)

- neutron capture by ethyl, recoil Br atoms from, 10: 3650(R)

## Bromine

- activation determination, 10: 2632(J)
- gamma spectra from neutron capture in, 10: 2496
- internal conversion in radiative capture, 10: 3651(R)
- molecular properties of solid, 10: 3270
- vapor pressure from 24 to 116°C, 10: 2622(J)

## Bromine fluoride-antimony fluoride systems

- phase studies, 10: 1261(J)

## Bromine fluorides

- electrical properties and molecular structure, 10: 91(J)
- infrared and ultraviolet spectra of BrF<sub>3</sub> and BrF<sub>5</sub>, 10: 3747(R)
- magnetic susceptibilities, 10: 92(J)

## Bromine ions

- charge transfer experiments, 10: 2496

## Bromine isotopes

- electromagnetic separation, 10: 3026(R)
- internal conversion studies, 10: 3652(R)

Bromine isotopes Br<sup>80</sup>

- angular correlation of internal conversion electrons of, 10: 470(J)
- gamma reactions, 10: 571(R)
- isomeric transition, 10: 3657
- isomeric transition, conversion coefficients, 10: 3656



**Bromine isotopes Br<sup>80</sup> (cont'd)**

- isomeric transitions in, 10: 3654(R)
- reactions with benzene compounds, hot-atom chemistry, 10: 2030(J)

**Bromine isotopes Br<sup>82</sup>**

- decay scheme, 10: 3367(R)

**Bromine isotopes Br<sup>81</sup>**

- decay schemes, 10: 2496
- half lives, 10: 3650(R)

**Bromine isotopes Br<sup>80</sup>**

- half lives, 10: 3650(R)

**Bronze**

- phosphor, microstructure, 10: 234

**Brookhaven Graphite Reactor**

- (See Brookhaven Reactor.)

**Brookhaven National Lab., Upton, N. Y.**

- administrative reports and research programs, 10: 3387(R)
- progress letters on Liquid Metal Fuel Reactor, 10: 2440(R)
- progress reports, 10: 1(R), 3143(R), 3387(R)
- progress reports on LMFR, 10: 2518(R)
- progress reports on waste processing, 10: 2252(R)
- radioactive waste, monitoring of, before marine burial, 10: 755(J)

**Brookhaven Reactor**

- barometric coefficient, simulated, 10: 3389
- barometric effects on criticality, 10: 3390
- control, criticality studies, design, neutron flux distribution, Xe poisoning, reactivity, and theory, 10: 3037
- criticality, effect of fuel temperature on, 10: 3388
- criticality studies, barometric effect, 10: 3389
- design, initial experiments, 10: 3731
- fast flux measurements, 10: 3035(R)
- fuel elements, escape of fission products from, and He leak detection systems for, 10: 2513
- loading, criticality, and flux distribution, 10: 3042
- neutron fast source corrections to diffusion length in graphite, 10: 2515
- operation, 10: 3143(R)
- parameters of, evaluation, 10: 3233
- power regulation in, control systems for, 10: 2542
- reactivity changes with barometric pressure, 10: 3389
- reactivity changes with fuel temperature, 10: 3388
- startup instrumentation, counting losses in, 10: 3213
- startup sequence for, 10: 3231
- stress distribution in fuel elements during flash, 10: 3863
- temperature coefficient measurements, 10: 3865
- temperature coefficients of thermal utilization and  $\eta$  for, 10: 3039
- temperature distribution, axial, 10: 3864
- thermal utilization factor measurement, 10: 3866
- water-spray cooling, 10: 3386

**Brookhaven Synchrotron**

- maintenance of, 10: 1(R)
- operation, 10: 3143(R)

**Brooklyn. Polytechnic Inst.**

- progress reports on crystal structure of mixed oxides, 10: 1752(R)

**Brown Univ., Providence**

- progress reports, 10: 3528(R)

**Brown Univ., Providence (cont'd)**

- progress reports on radioinduced bacteremia, 10: 3250(R)
- progress reports on reactions of fast neutrons, 10: 1508(R)

**Brule Formation (Nebr.)**

- geology and mineralogy, 10: 3192

**Brule Formation (S. Dak.)**

- geology, 10: 1790(J)

**Brushy Basin Member (N. Mex.)**

- geology, 10: 799, 2063

**BSR**

- (See Bulk Shielding Facility)

**Bubble chambers**

- development and testing at UCRL, 10: 3222(R)
- development status of the 4-, 10-, 72-inch, 10: 1009(R)
- hydrogen, safety, 10: 1217
- liquid hydrogen, design and performance, 10: 261(J)
- liquid H<sub>2</sub>, exhaust system testing and safety hazards, 10: 919
- operating conditions of n-pentane, iso-pentane, and diethyl ether, 10: 960(J)
- operation of liquid hydrogen, 10: 3854
- pressure gage design for, 10: 3204

**Bubbles**

- flotation and kinetics flotation agents on, 10: 1781(R)
- formation, a literature survey, 10: 3697
- formation, mathematical analysis, 10: 760
- gas, size and mass transfer studies, 10: 1733(J)

**Buckley Mine (Colo.)**

- uranium distribution, 10: 1363(J)

**Buffalo Creek Placer Deposits (N.C.)**

- exploration, geology, and mineralogy, 10: 804

**Building materials**

- (See also specific materials.)

- corrosion in 500 and 600°F water, 10: 1806
- corrosion in Hanford process solution, 10: 3595
- corrosion-resistant properties, 10: 3278
- creep buckling, plastic deformation, 10: 185
- ethylene polymer coatings for, 10: 1658(P)

**Bulk Shielding Facility**

- cooling systems for, analysis, 10: 3875
- fast neutron spectra, 10: 3859
- gamma distribution through H<sub>2</sub>O in, 10: 2532
- gamma radiation from attenuation in Fe-H<sub>2</sub>O mixtures, 10: 2508
- neutron energy measurements in, using radioactivants, 10: 3382
- neutron flux distribution and reactivity calculations, 10: 3674
- neutron flux measurements and power distribution calculations, 10: 2530
- radiation from, control rod calibration, and reactivity, 10: 320(R)

**Bull Canyon District (Colo.)**

- petrology, 10: 149(R)

**Bullion Mine (Colo.)**

- exploration, 10: 1363(J)

**Bureau of Mines. Electrotechnical Lab., Norris, Tenn.**

- progress reports on refractory development, 10: 2408(R), 2409(R), 2410(R), 2411(R), 2412(R), 2413(R), 2414(R), 2415(R), 2416(R), 2417(R), 2418(R), 2419(R), 2420(R), 2421(R), 2422(R), 2423(R), 2424(R), 2425(R), 2426(R), 2427(R)

Bureau of Mines. Northwest Electrodevelopment Experiment Station,  
Albany Oreg.

progress reports on zirconium, 10: 858(R), 859(R)

#### Burns

effects on myocardial function, 10: 3165(R)

pathology, relationship between surface grade and depth of injury in  
parcine skin, 10: 3771

production on pig skin, 10: 1984

production on skin of swine, effects of superimposed exposures, 10: 3253  
of skin, production in swine, 10: 2243

#### Burnt Fork Area (Wyo.)

exploration, uranium occurrence, 10: 151

#### Burro Canyon Formation (Colo.)

geology, 10: 154(J), 156(J), 157(J), 158(J), 159(J)

#### Butadiene, tetraphenyl

scintillation detector of, dissolved in polystyrene, 10: 269(J)

#### Butane (labeled)

preparation and use in tritium determination, 10: 1875(J)

#### 1,3-Butanedione, 4,4,4-trifluoro-1-(2-Thienyl)-

(See Acetone, thenoyltrifluoro-.)

#### Butene polymers

radiation induced changes in structure of, 10: 445(J)

#### Butyl phosphate-carbon tetrachloride systems

density of, containing traces of U and HNO<sub>3</sub>, 10: 2376

#### Butyl phosphate-kerosene systems

analysis for butyl phosphates by dielectric constant measurements,  
10: 3436

#### Butyl phosphates

analytical uses for U, factors influencing, 10: 3181

determination in kerosene by dielectric constant measurements, 10: 3436

determination of, in aqueous or organic solutions, 10: 61

Infrared spectrophotometric determination, calibration data, 10: 2339

preparation of P<sup>32</sup>-labeled TBP, 10: 579

solvent properties for rare earths, 10: 3785

solvent properties for U and Pu, 10: 3496

specific heat at 25 and 61°C, 10: 2663

spectrographic determination in waste solutions, 10: 3439

## C

#### Cables

(See also Connectors (electric); Disconnects.)

design, production, and termination of power supply, 10: 3532

design of high voltage Kerite, for electromagnetic plant, 10: 3583

radioinduced currents in solid dielectric RG 8/U, 10: 3155

#### Cadmium

capture  $\gamma$ -ray spectrum, 10: 3653(R)

colorimetric determination in U<sub>3</sub>O<sub>8</sub>, 10: 2281

criticality effects in H<sub>2</sub>O-moderated lattices, 10: 3145

determination, organic reagents for, 10: 2997

gravimetric determination in Cd-Pu alloys, 10: 2351

neutron attenuation, 10: 3379(R)

neutron resonance absorption, 10: 3659(R)

photon elastic scattering cross-section measurement, 10: 434(J)

reactivity effects, in the MTR, 10: 1036

#### Cadmium (cont'd)

solubility in liquid CdCl<sub>2</sub>, 10: 1221(J)

spectrophotometric determination of, in Cd-Pb alloys, 10: 3441

Zeeman spectra, 10: 3026(R)

#### Cadmium alloys

corrosion in 500 and 600°F water, 10: 1806

#### Cadmium-cadmium chloride systems

phase studies, 10: 1221(J)

#### Cadmium chloride-cadmium systems

phase studies, 10: 1221(J)

#### Cadmium chlorides (liquid)

solvent properties for Cd, 10: 1221(J)

crystal structure of irradiated, 10: 3035(R)

#### Cadmium iodides

potentiometric titration with K in liquid NH<sub>3</sub>, 10: 591(J)

#### Cadmium isotopes

gamma yields after Coulomb excitation, 10: 320(R)

#### Cadmium isotopes Cd<sup>104</sup>

production by Ag<sup>107</sup>(p,4n)Cd<sup>104</sup>, and decay properties of, 10: 1908(J)

#### Cadmium isotopes Cd<sup>111</sup>

electric moments, interaction with electric field of a cubic crystal,  
10: 1913(J)

excited state, half life of first, 10: 2936(J)

#### Cadmium isotopes Cd<sup>113</sup>

radioactivity, 10: 1601

#### Cadmium isotopes Cd<sup>114</sup>

Coulomb excitation, angular distribution of  $\gamma$  rays from, 10: 2145(J)

Coulomb excitation  $\gamma$  correlation, quantum calculations, 10: 367(J)

gamma emission, angular distribution of, 10: 320(R)

#### Cadmium isotopes Cd<sup>116</sup>

double  $\beta$  radioactivity, possibility, 10: 2931(J)

#### Cadmium-lead alloys

spectrophotometric determination of Cd in, 10: 3441

#### Cadmium-plutonium alloys

analysis for Cd, 10: 2351

#### Cadmium selenides

resistivity and Hall effect, 10: 1752(R)

#### Cadmium sulfide crystals

preparation and properties for use as detectors, 10: 221

silver activated, model for, 10: 2753(J)

#### Caffeine

pathological effects in Russian rabbits, 10: 3261(J)

#### Calamity Mesa Quadrangle (Colo.)

exploration, geology, and mineralogy, 10: 157(J)

#### Calcite

flotation from lime Ute ores, 10: 3273

neutron total cross sections, 10: 3650(R)

#### Calcium

analysis for Al, Fe, Cr, Mn, Ni, Si, and N, 10: 609

analysis for carbon, 10: 2298

bone deposition, effects of dietary level in experimental animals,  
10: 2973

bone deposition, tracer study, 10: 3327(R)

cation transport in aquatic plants, 10: 3164

determination of impure U leach liquors, 10: 3446

electric conductivity, 10: 3196(R)

electrochemical properties, 10: 3501

## Calcium (cont'd)

- heat of combustion, 10: 307
- ion exchange separation of, from milk, tracer study, 10: 726
- metabolism in domestic animals, 10: 1169(R)
- metabolism in domestic animals, tracer study, 10: 3769(R)
- phase studies in Ce-Ca-Cl system, 10: 657(J)
- purification by electrolysis of  $\text{CaCl}_2$ , 10: 2255(R)
- purification of noble gases by, 10: 3293
- reactions with  $\text{N}_2$  from 300 to 600°C, 10: 588(J)
- separation from other alkaline earth metals by paper chromatography, 10: 1307(J)
- spectrographic determination in barium nitrate, 10: 1234
- spectrographic determination in plant and food samples, 10: 2973
- spectrophotometric determination of, in sea water, 10: 1241
- uptake by barley, factors affecting, 10: 508

## Calcium borohydrides

- synthesis, 10: 574
- synthesis, by reaction of  $\text{B}_2\text{H}_6$  with  $\text{Ca}[\text{B}(\text{OCH}_3)_4]_2$ , 10: 573

## Calcium carbonates

- precipitation, effects of ultrasonic waves on, 10: 3265(J)

## Calcium chloride-sodium chloride systems (liquid)

- electric conductivity, viscosity, and density with a simple eutectic, 10: 3827(J)

## Calcium chlorides

- electrolysis and purification, 10: 2255(R)

## Calcium fluorides

- phase studies, 10: 638(J)

Calcium isotopes  $\text{Ca}^{41}$ 

- nuclear energy levels and nuclear model analyses, 10: 345(J)
- production by  $\text{A}^{40}(\alpha, 3n)$  reaction, unsuccessful, 10: 2501(R)

Calcium isotopes  $\text{Ca}^{42}$ 

- nuclear energy levels and nuclear model analyses, 10: 345(J)

Calcium isotopes  $\text{Ca}^{43}$ 

- eigenvalues, excited states, and magnetic moments, 10: 1411(R)
- nuclear energy levels and magnetic moment predictions using nuclear shell model, 10: 345(J)

Calcium isotopes  $\text{Ca}^{47}$ 

- decay schemes, 10: 2199(J)

Calcium isotopes  $\text{Ca}^{48}$ 

- double  $\beta$  decay, 10: 475(J)
- radioactivity, 10: 1601

Calcium isotopes  $\text{Ca}^{49}$ 

- decay schemes, 10: 3144(R)

## Calcium nitrates

- thermal conductivity, 10: 3641

## Calcium oxide-zirconium oxide systems

- solid solutions in, mechanism of formation, 10: 75(J)

## Calcium oxides

- heat of formation from combustion measurements, 10: 307
- high-temperature properties and applications, 10: 1345(J)

## Calcium silicates

- phase studies, 10: 638(J)

## Calculators

(See Computers.)

## California

- airborne radiometric survey in San Bernardino and Kern Cos., 10: 1784

## California (San Bernardino Co.)

- geophysical exploration of Rock Corral Area in, 10: 161(J)

## California Inst. of Tech., Pasadena. Jet Propulsion Lab.

- progress reports on heat of formation and entropy of  $\text{TlCl}_4$ , 10: 572(R)

## California Inst. of Tech., Pasadena. Norman Bridge Lab. of Physics

- progress reports on nuclear physics, 10: 3851(R)

## California. Univ., Berkeley. Radiation Lab.

- progress reports, 10: 2501(R)
- progress reports of Chemistry Division, 10: 1729(R), 3104
- progress reports of Medical and Health Physics Dept., 10: 3165(R)
- progress reports of Physics Div., 10: 1009(R), 3222(R), 3854
- progress reports on bevatron operation and development, 10: 1081(R), 2181(R), 3239(R)
- progress reports on medical and health physics, 10: 1696(R)
- California. Univ., Berkeley. Sanitary Engineering Research Lab. progress reports on waste disposal, 10: 1327(R)

Californium isotopes  $\text{Cf}^{250}$ 

- alpha and  $\gamma$  spectra, 10: 454(J)

Californium isotopes  $\text{Cf}^{252}$ 

- alpha and  $\gamma$  spectra, 10: 454(J)
- fission, neutron energy spectrum from spontaneous, 10: 2144(J)

## Calorimeters

- adiabatic specific heat, for 15 to 290°C, design, 10: 2023(R)
- design and calibration of adiabatic, 10: 929
- macro- and micro-, steady-state resistance-bridge type, design, 10: 236
- twin differential solution and reaction, performance, 10: 3286(R)

## Calutrons

(See also Electromagnetic separation plant.)

- acceleration systems, 10: 3628
- arc plasma, theory, 10: 2475
- beam-current integrators for, design, 10: 1690(P), 1691(P)
- beta source unit vapor measurements, 10: 3626
- cables, design of, 10: 3582
- collector units, delimiting vane type, 10: 3067(P), 3070
- collector units, modifications in design for reduction of ion sputtering, 10: 3068(P)
- collector units (decelerating), design, 10: 3078(P)
- collector units (production), design, 10: 3079(P)
- collector units for components of a shimmed ion beam, 10: 3074(P)
- collector units for polyisotropic ion beams, 10: 3072(P)
- design, 10: 1863
- electrical circuits for high-voltage, arc, and magnet regulation, 10: 927
- electrical equipment for, 10: 3140
- electron formation and drain in acceleration region, 10: 2460
- electron motion in fields associated with, 10: 2479
- filament systems, 10: 2476
- focusing, magnetic shims for, 10: 1684(P)
- ion beam intensity, improvements in, 10: 3069(P)
- ion motion in fields associated with, 10: 2473
- ion source cathodes, 10: 3633
- ion source problems in, including design, electron drain, and vapor control, 10: 3210
- ion-source regulators for, design, 10: 1681(P)



## Calutrons (cont'd)

- ion source units for, design, 10: 1667(P)
- ion sources, current drain and electrode wear in, 10: 3077(P)
- ion sources for, charge receptacles in, design of, 10: 1682(P)
- ion sources for, design, 10: 1663(P), 1664(P), 1665(P), 1678(P), 1679(P), 1685(P)
- magnet arrangement in, 10: 3081(P)
- magnet design and magnetic measuring techniques, 10: 926
- operation, effect of high magnetic field, 10: 3632
- operation, summary, 10: 2470
- operation and equipment, 10: 3836
- operational parameters, 10: 2474
- process efficiency determinations, preparation of  $\text{UCl}_4$  sticks for, 10: 3627
- recycle recovery of rhenium from, 10: 2335
- shielding for removal of oscillating electrons, design, 10: 3071
- source and collector units, arcs, and charge materials, 10: 938
- track assembly of, for space economy and increased separating capacity, 10: 1689(P)
- uranium charge materials, 10: 3631
- uranium ( $\text{U}^{235}$ ) recovery from collector carbon, 10: 3568

## Cameras

(See also Photography; X-ray cameras.)

- design and construction of 1 million fps, 10: 231
- design and performance of a sweeping-image, with  $10^{-8}$  sec resolution, 10: 3201

## Cameron Area (Ariz.)

- exploration of Chinle Formation in, 10: 796

## Cancer

(See Carcinomas; Tumors.)

## Canon City Embayment Area (Colo.)

- exploration, 10: 1352

## Canyon Ferry Quadrangle (Mont.)

- exploration, geology, and radioactivity, 10: 153

## Capacitors

- discharging, electrical circuits for, 10: 1672(P)
- electrical discharge in cyclotron, 10: 3620

## Caprylic acids, thio-

- metabolism in algae, 10: 1729(R)
- photolysis and quantum yields, 10: 2031(J)
- synthesis of  $\text{S}^{36}$  labeled, 10: 1729(R)

## Capture-to-fission ratios

(See also Neutron cross sections.)

- variations in 100- to 1000-ev range, 10: 3033

## Carbide and Carbon Chemicals Co. Y-12 Plant, Oak Ridge, Tenn.

- progress reports on  $\text{ZrO}_2$  production, 10: 3793(R)
- uranium content of sewage in 1949, 10: 3580

## Carbides

- powder extrusion of high melting point metals, 10: 1407(J)
- preparation and chemical analysis of Th, Ta, Be, and Zr, 10: 3590

## Carbohydrates

(See also Sugars.)

- exchange in animal organs, effect of radiation on, 10: 1175(J)
- ultraviolet absorption, effect of  $\gamma$  radiation, 10: 1171(J)

## Carbon

(See also Carbon black; Diamonds; Graphite.)

- bremsstrahlung in, from absorption of  $\text{S}^{36}$  electrons, 10: 477(J)
- combustion determination in calcium, 10: 2298
- determination in sodium, 10: 1738
- determination in  $\text{UF}_4$ , 10: 1739
- diffusion in Ti and Ti alloys, 10: 1389
- effects on mechanical properties of Ti and Ti alloys, 10: 1388
- electroplating with Cu, 10: 2455
- elimination from molten steel, kinetics of, 10: 876(J)
- gasometric determination in Pu, 10: 2300
- $\pi^-$  meson interactions, 10: 274(J)
- mesonic x rays from capture of  $\mu$  mesons by, 10: 1484(J)
- metabolism of, in *Trichinella* larvae, tracer study, 10: 557(J)
- neutron polarization in elastic scattering, 10: 439(J)
- neutron total cross sections, 10: 3649(R)
- photoneutrons produced in, energy and angular distributions of, 10: 1899(J)
- proton scattering, asymmetries in double charge-exchange, 10: 1939
- proton scattering, polarization energy dependence in, 10: 3047
- protons elastically scattered from, polarization of, 10: 1593(J)
- solubility in Th, 10: 2720
- spectrochemical determination of trace amounts of B in, 10: 617(J)
- ultraviolet microscopic structure investigation of titanium, niobium and alloys, 10: 1408(J)
- uranium recovery, 10: 2366, 3629, 3630
- x-ray-diffraction pattern of, as a means of distinguishing from graphite, 10: 624(J)

## Carbon (activated)

(See also Charcoal.)

- adsorption of Xe by, 10: 2338
- iodine saturated, as an absorbent for Hg vapor, 10: 2605(J)

## Carbon black

- preparation and properties, 10: 2022

## Carbon dioxide-water systems

(See also Carbonic acids.)

- phase studies, 10: 821(J)

## Carbon dioxides

(See also Carbonic acids; Photosynthesis.)

- absorption in water drops, 10: 1733(J)
- chromatographic analysis, tracer study, 10: 3104
- physical-chemical properties, 10: 821(J)
- radiation effects, 10: 2977

## Carbon fluorides

(See Fluorocarbons.)

## Carbon ion beams

- production, methods for increasing output, 10: 2478

## Carbon isotopes

- nuclear reactions (d,n), thresholds and cross sections for, 10: 1579(J)
- radiometric determination of, in dating of archeological specimens, 10: 1104(J)
- separation procedures, 10: 2470

Carbon isotopes  $\text{C}^{14}$ 

- production from C by 200- to 950-Mev protons, 10: 1569(J)

**Carbon isotopes  $C^{12}$** 

- analysis of  $\pi^- + C^{12}$  reaction, 10: 3032
- deuteron reactions (d,n) and (d,t), cross sections, 10: 394(J)
- deuteron reactions (d,p), energy levels and proton angular distribution, 10: 404(J)
- energy levels in compound nucleus, 10: 346(J)
- excitation levels from 22-Mev  $\alpha$ -particle scattering, 10: 354(J)
- excited states, determination of spin and parity from  $B^{14}(p,\alpha)$  reaction, 10: 357(J)
- gamma reactions ( $\gamma,\alpha$ ), and energy levels, 10: 2176(J)
- gamma reactions ( $\gamma,n$ ), yield curve near threshold, 10: 2177(J)
- gamma spectra, 10: 3854
- proton reaction (p, $\gamma$ ) cross sections, 10: 402(J)
- proton reactions, range spectra for p- $\alpha$ , 10: 3222(R)
- proton reactions (p, $\alpha$ ) at 32 Mev, 10: 1009(R)

**Carbon isotopes  $C^{13}$** 

- energy level in the areas of higher excitation, study of, 10: 342(J)
- gamma radiation from  $C^{13}(d,p)\gamma C^{14}$  reaction, 10: 1575(J)
- proton reaction (p,n) cross section, 10: 398(J)

**Carbon isotopes  $C^{14}$** 

- body content, radiometric determination, 10: 3175
- dating, with methane proportional counter, 10: 2198(J)
- decay, 10: 1605(J)
- determination, scintillation counter employing automatic sample alternation for, 10: 1874(J)
- determination in organic compounds by proportional counting, 10: 1252(J), 1253(J)
- half life, and correlation with  $N^{14}(n,p)C^{14}$  reaction, 10: 3650(R)
- measurement in gaseous phase, techniques and apparatus for sample preparation and counting, 10: 969(J)
- preparation of activity standard from, 10: 2831(J)
- production in reactors by  $N^{14}(n,p)C^{14}$  reaction, 10: 3623
- production techniques, 10: 3659(R)
- radiometric analysis, 10: 2115(J)

**Carbon isotopes  $C^{16}$** 

- deuteron reactions (d,p), energy levels and proton angular distribution, 10: 404(J)
- ground state spin, 10: 2870(J)

**Carbon-manganese-zinc systems**

- magnetic properties, 10: 1411(R)

**Carbon monoxides**

- oxidation by atomic  $O_2$ , effect of surface adsorption on, 10: 589(J)
- protective effects of, against radiation injuries in guinea pigs, rats, and rabbits, 10: 44(J)
- radiation effects, 10: 2977

**Carbon steel**

- corrosion by water and feasibility for use in reactors, 10: 2745(J)
- dimensional stability and welding to stainless steel, 10: 2717
- impact and tensile properties, effects of radiation on, 10: 2073
- in-pile corrosion tests, 10: 3825
- mechanical properties of irradiated, 10: 3035(R)
- microstructure, 10: 234
- radiation damage, 10: 1507(R)

**Carbon tetrachloride-butyl phosphate systems**

- density of, containing traces of U and  $HNO_3$ , 10: 2376

**Carbon tetrafluoride**

- radiation effects, 10: 2977

**Carbon-thorium systems**

- hardness and effects of heat treatment on lattice constants, 10: 2720

**Carbon-uranium sandstone deposits (U.S.)**

- geochemistry, 10: 2067(R)

**Carbon-uranium sandstone deposits (Utah)**

- occurrence in Caribou Mountains, 10: 151
- occurrence in Temple Mountain District, 10: 1785(R)

**Carbon-uranium systems**

- physical properties, 10: 3761

**Carbon-zirconium oxide systems**

- equilibrium studies at high temperatures, 10: 1343(J)

**Carbonaceous rocks**

- radioactivity in, of Pennsylvania, 10: 2065

**Carbonaceous shale deposits (Penna.)**

- radioactivity and uranium occurrence, 10: 152

**Carbonic acids**

- (See also Carbon dioxide-water systems: Carbon dioxides.)

- reaction of hydrogen exchange in dibasic saturated, 10: 600(J)

**Carcinogenesis**

- (See also Carcinomas.)

- radioinduced, review, 10: 1180(J)

**Carcinomas**

- (See also Carcinogenesis.)

- radiotherapy of, 10: 1198(J)

**Caribou Mountains (Idaho)**

- exploration for U-bearing coal in, 10: 151

**Carnegie Inst. of Tech., Pittsburgh**

- progress reports on lattice imperfections and grain boundaries, 10: 1814(R)
- progress reports on radiation effects on solids, 10: 1944(R)

**Carnitine hydrochloride**

- synthesis, 10: 3104

**Carnotite deposits (S. Dak.)**

- occurrence in Cedar Canyon, 10: 1790(J)

**Carnotites**

- acid and organic leaching for U recovery, 10: 1289(R)
- acid and organic leaching of, for recovery of U and V, 10: 693(R), 695(R)
- acid leaching for U recovery, 10: 687(R)
- acid leaching of U and V from, 10: 692(R)
- crystallography, 10: 2066
- occurrence in the Brule and Chadron Formations in Dawes Co. Nebr., 10: 3192
- organic leaching for U recovery, 10: 689(R)
- organic leaching of, in recovery of U from, 10: 686(R)
- processing, production and consumption of HCl in, 10: 2267
- processing for U recovery, 10: 691(R)
- processing for U separation and recovery, 10: 3751(R)
- production of U and V from, by acid leaching and solvent extraction, 10: 694(R)
- recovery of U and V from leach solutions of, 10: 699(R), 708(R), 709(R), 710(R)

- solubility and amenability tests of, and U and V recovery from, 10: 689(R)

- uranium and vanadium recovery by leaching, 10: 701(R)

- uranium and V recovery from, 10: 698(R), 700(R)

- uranium and V recovery from, by solvent extraction, 10: 704(R), 705(R), 706(R), 707(R)

## Carroll Mine (Colo.)

geology, pitchblende occurrence, 10: 1363(J)

## Case Inst. of Tech., Cleveland

progress reports on high-temperature scaling behavior of Zr, 10: 3280(R)

progress reports on high temperature scaling of Co-Cr alloys,  
10: 1373(R)

progress reports on scaling of Zr, 10: 1805(R), 3281(R)

## Cast iron

containing globular graphite, creep, 10: 881(J)

## Castings

astrolite cylinders, 10: 1468

internal defects, detection by gamma radiography, 10: 3128

## Castle Operation

fall-out from, pathological effects on Marshallese and Americans, 10: 16

## Cataract Canyon Area (Utah)

geophysical exploration, U distribution, 10: 806

## Cataracts

iodoacetic acid induced, in rabbits, 10: 1717

lens opacities in rabbits produced by microwaves, 10: 1173(J)

radioinduced, in rabbits, 10: 2580(J)

radioinduced in mice, 10: 3768(J)

## Caves

design, 10: 2024

design for handling reactor fuels, 10: 3110

equipment and design, 10: 379

operation of, for handling radioactive materials, 10: 3244

underwater, for examining irradiated fuels, 10: 2744(J)

## Cavity resonators

design for proton linear accelerators, 10: 1074

design of, for accelerating protons from 50 to 150 Mev, 10: 2904

## Cedar Canyon (S. Dak.)

exploration and geology, 10: 1790(J)

## Cells

(See Animal cells.)

## Cells (animal)

(See Animal cells.)

## Cells (biology)

(See Animal cells.)

## Cements

(See also Concretes; Portland cements.)

gamma scattering, 10: 2549

optical, for NaI(Tl) crystals, 10: 1891(J)

## Central City District (Colo.)

uranium distribution in Eureka Gulch Area, mineralogy, 10: 1363(J)

## Centrifuges

head design, for differential centrifugation, 10: 1168(R)

performance in separation of U salts from sodium diuranate slurries,  
10: 3558

## Ceramic bodies

preparation of boron carbides, 10: 3064(P)

## Ceramic insulators

electrical discharge in cyclotron, 10: 3620

## Ceramic materials

bibliography on, 10: 785

corrosive effects of fused NaOH on, 10: 2702, 3282

## Ceramic materials (cont'd)

physical and chemical properties of high-temperature, 10: 3589

preparation and testing of  $\text{UO}_2$  and  $\text{ThO}_2$ , 10: 3603

radiation stability of MTR-irradiated, 10: 3035(R)

SiC-graphite, effects of SiC grain size, 10: 791

technology for nuclear applications, review, 10: 2701(J)

## Cherenkov radiation

(See Cherenkov radiation.)

## Cerium

(See also Rare earths.)

allotropic forms, transition temperatures, and lattice constants,  
10: 569(R)

colorimetric determination, by complex formation with Tiron,  
10: 1745(J)

determination, 10: 3433

hardness, density and melting point, 10: 1817

magnetic susceptibility of metallic, 10: 1403(J)

metabolism and excretion rates of, in rats, 10: 1694

phase studies in Ce-Ca-Cl system, 10: 657(J)

preparation by electrolysis and reduction of  $\text{CeCl}_4$  and bomb reduction of  
 $\text{CeCl}_3$ , 10: 1817

prevention of coloration in glasses, 10: 1947(J)

purification by casting in vacuo, 10: 1817

surface properties, determination of, 10: 3788(R)

surface tension on refractory oxides, 10: 1774(R)

## Cerium compounds

colorimetric analysis for Fe, 10: 3429

## Cerium hydrides

crystal structure, 10: 2034(J)

## Cerium-hydrogen systems

phase studies, 10: 2033(J)

## Cerium ions

oxidation of  $\text{Ce}^{3+}$  to  $\text{Ce}^{4+}$  with cobaltic ion in acid solution, 10: 1285(J)

## Cerium(III) ions

reactions with  $\text{S}_2\text{O}_8^{3-}$ , kinetics and mechanisms, 10: 104(J)

## Cerium(IV) ions

coulometric titration with  $\text{U}^{6+}$ , 10: 752(J)

reduction in aqueous solutions, effect of  $\text{Au}^{198}$  radiation on, 10: 94(J)

Cerium isotopes  $\text{Ce}^{137}$ 

decay scheme and isomeric transition, 10: 456(J)

Cerium isotopes  $\text{Ce}^{141}$ 

nuclear orientation,  $\gamma$  transition, and nuclear moment, 10: 2148(J)

Cerium isotopes  $\text{Ce}^{144}$ 

gamma transitions, 10: 3851(R)

## Cerium nitrates

potentiometric analysis with oxalates and NaOH using glass electrode,  
10: 2635(J)

## Cerium nitrides

preparation by reaction of  $\text{CeCl}_3$  with liquid ammonia, 10: 2251(R)

## Cermets

diffusibility, thermal shock, oxidation, and diffusion, 10: 786

fabrication, testing, and properties of  $\text{Al}_2\text{O}_3$ -Cr-Mo, 10: 1783(J)

high-temperature, effects of static compression stresses at temperatures  
from 1350 to 1800°F on creep in, 10: 142

with nickel aluminide (NiAl), development and properties, 10: 1391



## Cermets (cont'd)

- oxidation and physical characteristics of  $B_4C-SiC-TiC$  and  $TiC-VC-ZrC$ , 10: 788
- preparation and physical properties of, at high temperatures, 10: 789
- preparation and properties of metal bonded to Zr diboride, 10: 2700
- tensile properties of  $TiC$ -base, 10: 3589

## Cesium

- determination, 10: 3433
- determination in K-Na alloys, KOH, and KCl by radioactivation and ion exchange chromatography, 10: 1232
- extraction from aqueous solutions of sodium tetraphenylboride, 10: 1903(R)
- ion exchange between aqueous chlorides and montmorillonite clays, 10: 2039(J)
- ion exchange separation of trace amounts from macro amounts of Na and K, 10: 2330
- metabolism in domestic animals, tracer study, 10: 3769(R)
- precipitation with chloroplatinic acid, 10: 2293
- purification of, by ion exchange, 10: 106
- surface tension in diluted-to-capacity amalgam of, 10: 602(J)
- Cesium-antimony cathodes
  - photoeffects of, sensitized by oxygen, 10: 1844(J)

## Cesium-bismuth alloys

- superconductivity, 10: 197(J)

## Cesium-bismuth cathodes

- photoeffects of, sensitized by oxygen, 10: 1844(J)

## Cesium iodide crystals

- energy response to protons and phosphorescence, 10: 3144(R)
- proton detection, 10: 2844(J)
- Cesium iodides
  - light spectra effects on luminescence emission, 10: 2946(J)
  - optical properties for wavelengths from ultraviolet to infrared, 10: 1418(J)

## Cesium isotopes

- relative abundance, 10: 2494(R)

Cesium isotopes  $Cs^{133}$ 

- fission yields from thermal neutron fission of  $U^{235}$ , 10: 1580(J)

Cesium isotopes  $Cs^{134}$ 

- beta decay, 10: 446(J)
- decay, 10: 449(J)

Cesium isotopes  $Cs^{137}$ 

- decay schemes, 10: 3650(R)
- nuclear spin determination by magnetic resonance, 10: 1837(R)

Cesium isotopes  $Cs^{135}$ 

- fission yields from thermal neutron fission of  $U^{235}$ , 10: 1580(J)

Cesium isotopes  $Cs^{137}$ 

- fission yields from thermal neutron fission of  $U^{235}$ , 10: 1580(J)
- half life, 10: 458(J)

Cesium isotopes  $Cs^{137}$ 

- radiotherapeutic uses and decay characteristics, 10: 2002(J)
- relative fission yields from pile-neutron-fission of natural U, 10: 500

Cesium isotopes  $Cs^{139}$ 

- beta spectra, 10: 3329(R)

Cesium isotopes  $Cs^{144}$ 

- radiometric determination, 10: 2293

## Chadron Formation (Nebr.)

- geology and mineralogy, 10: 3192

## Chadron Formation (S. Dak.)

- geology, 10: 1790(J)

## Chain reactions

- (See also Criticality studies; Multiplication Factor.)
- in uranium, review of experiments, 10: 3247(J)

## Charcoal

- (See also Carbon (activated).)
- adsorption of  $He^3$  and  $He^4$  on activated, 10: 200
- sorptive properties for boron compounds, 10: 1724

## Charged particle beams

- focusing of monoenergetic, with sector-shaped magnetic fields, 10: 2183(J)
- graphite bombardment by, ionization and energy transfer by, 10: 2316
- graphite ionization by, and reactivity changes, 10: 2318
- space charge effects during diffusion, 10: 3019(J)

## Charged particles

- acceleration by a probability mechanism, 10: 1589(J)
- acceleration of 4-Mev, by cascade generator, 10: 1936(J)
- angular and energy distribution, from C, Al, Ni, Ag, Au, proton bombardment, 10: 3222(R)
- diffusion rate across magnetic fields, due to collision of like, 10: 2961(J)
- energy and radiation fields of moving, in a gyrotropic medium, 10: 204(J)
- energy losses traversing ferromagnetic materials, 10: 1627(J)
- interactions of electromagnetic field with, 10: 1964(J)
- motion in magnetic fields, 10: 1131(J)
- multiple scattering, parameter for characterization of, in emulsions and cloud chambers, 10: 2914(J)
- recording of tracks in luminescent media, use of multigrid electron-optic tubes for, 10: 2819(J)
- self-acceleration, under the action of its own field, 10: 1620(J)
- trajectories in magnetic fields, 10: 1412

## Chattanooga shale

- leaching for U recovery, 10: 3789
- recovery of U from, 10: 699(R)
- uranium recovery, 10: 698(R), 2999(R)
- uranium recovery by solvent extraction, 10: 697(R)

## Chattanooga shale (Tenn.)

- investigation of, as a source of U, 10: 2062(R)

## Chelates

- (See also specific chelates.)
- formation constants, estimation, 10: 2008
- formation constants and reactions in organic solvents, 10: 570(R)

## Chemical analysis

- laboratory manual, 10: 1748(J)
- organic reagents for, 10: 2997
- quantitative, survey of masking agents in, 10: 3108
- of uranium and other elements of interest to the Manhattan District, 10: 3419(R)

## Chemical radiation detectors

- (See also Radiation detection instruments (colorimetric).)
- ceric-cerous, effect of light on, 10: 651(J)
- design and performance of Ag-bearing phosphate glass, 10: 3301
- performance of silver-activated phosphate glass, 10: 955(R)
- preparation of glass detectors for  $\gamma$  radiation, 10: 3845
- properties of silver and cobalt glass for megareöntgen dosimetry, 10: 2829(J)

## Chemical radiation detectors (cont'd)

silver-activated phosphate glass, properties and use in high-level dosimetry, 10: 2826(J)

## Chemicals and reagents

determination of trace  $\text{SO}_4^{2-}$  in reagent-grade  $\text{CaCO}_3$ ,  $\text{Na}_2\text{CO}_3$ , and  $\text{KCl}$ , 10: 611

## Chemistry conferences

proceedings of Bio-Assay and Analytical Chemistry meeting, Oct. 6 and 7, 1955 at NLCO, 10: 3175

## Cherenkov radiation

accompanying cosmic showers, observation, 10: 2765(J)

formulae for, 10: 204(J)

measurements, in liquids excited by  $\gamma$  rays, 10: 1945(J)

## Chicago. Univ. Air Force Radiation Lab.

progress reports, 10: 536(R)

## Chicago. Univ. Metallurgical Lab.

progress reports of Nuclear Physics Div., 10: 3658(R)

progress reports on basic chemistry of Pu, 10: 2346(R)

progress reports on corrosion tests, 10: 3593(R)

progress reports on Pu project, 10: 3504(R)

## Chickens

(See also Eggs.)

radiation syndrome, 10: 1161(R)

## Chinle Formation (Ariz.)

exploration of, U occurrence, mineralogy, 10: 796

## Chinle Formation (Colo.)

geology, 10: 154(J), 155(J), 156(J), 157(J), 158(J), 159(J)

## Chinle Formation (Utah)

geology, 10: 1784(R)

geology of, in Dripping Springs Area, 10: 798

## Chloride crystals

(See also Potassium chloride crystals; Sodium chloride crystals.)

heat capacities of (K,Na)Cl and K(Cl,Br) mixed crystals, 10: 1255(J)

## Chloride ions

spectrophotometric determination in aqueous  $\text{HNO}_3$  solutions, 10: 55

## Chlorides

(See also specific chlorides.)

gravimetric determination in HCP Process solutions, 10: 3533

ion exchange of, equilibrium constant for, 10: 2987

## Chlorination

gamma radiation effects, of aromatic compounds, 10: 2025

reaction vessels, development, 10: 3056(P)

## Chlorine

activation determination, 10: 2632(J)

analysis for fluorine, 10: 2279

chemical determination in  $\text{BCl}_3$ , 10: 3420

determination in polyhalo organic compounds, 10: 2269

exchange between  $\text{HCl}$  and  $\text{HAuCl}_4$  in organic solvents, 10: 3329(R)

exchange reactions between  $\text{Cl}^-$  and  $\text{PtCl}_4^{2-}$ , 10: 569(R)

exchange reactions between  $\text{CHCl}_3$  and inorganic chlorides, 10: 3569

exchange reactions of, between  $\text{Cl}^-$  and Pt chloro-complexes, 10: 62

gamma induced addition of, to aromatic hydrocarbons, 10: 1280(J)

ion exchange in concentrated alkali chloride- $\text{HCl}$  solutions, 10: 2668(J)

molecular properties of solid, 10: 3270

neutron capture gamma spectra, 10: 3654(R)

## Chlorine (cont'd)

phase studies in Ce-Ca-Cl system, 10: 657(J)

## Chlorine fluoride-hydrofluoric acid systems

phase studies and electric conductivity, 10: 633

## Chlorine fluorides

electric conductivity, 10: 633

electrical properties and molecular structure, 10: 91(J)

magnetic susceptibilities, 10: 92(J)

properties and toxicity in rats, 10: 1201(J)

Chlorine isotopes  $\text{Cl}^{34}$ 

decay, 10: 331(R)

Chlorine isotopes  $\text{Cl}^{35}$ 

neutron resonances, evidence for existence of negative energy, 10: 3656

nuclear quadrupole resonance, variation with pressure, 10: 341(J)

Chlorine isotopes  $\text{Cl}^{36}$ 

decay, K capture in, 10: 2196(J)

energy levels, 10: 2150(J)

energy levels, study by (d,p) reactions of  $\text{Cl}^{35}$ , 10: 1506(R)

Chlorine isotopes  $\text{Cl}^{37}$ 

recalls from  $\text{A}^{37}$  decay, spectrum of, 10: 320(R)

Chlorine isotopes  $\text{Cl}^{38}$ 

energy levels, 10: 2150(J)

energy levels, study by (d,p) reactions of  $\text{Cl}^{37}$ , 10: 1506(R)

yield in fission of  $\text{U}^{235}$ , 10: 3650(R)

## Chloroform

preparation of  $\text{Cl}^{36}$ -labeled, 10: 3569

## Chlorophylls

photochemistry, spectroscopy, and fluorescence, 10: 3766(J)

## Cholesterol

spectrophotometric determination of, in whole blood samples, 10: 11

## Cholesterol (labeled)

preparation, 10: 3167

## Choline analogs

radiolysis, 10: 1729(R)

## Cholinesterase

acetyl-, effects of radiation on, 10: 1(R)

erythrocyte titers, 10: 2634(J)

## Chromatography

applications in ultramicro inorganic analysis, 10: 3351

deciphering of spectra of diffraction grating spectrographs by, 10: 1122(J)

of lipids, indicators for, 10: 1305(J)

radiometric techniques in, 10: 3031

sensitivity of determinations, electrophoretic effect on, 10: 2629(J)

theory, mathematical analysis, 10: 1756(J)

## Chromel

(See Chromium-nickel alloys.)

## Chromium

colorimetric determination in alkali hydroxides, 10: 3109

colorimetric determination in Hg, 10: 2297

diffusion in Ni-base alloys, 10: 3364(J)

electrodeposition of, plates on Ti and Ti alloys, 10: 193

electrodeposition on Zr and Zr alloys, 10: 3358

## Chromium (cont'd)

- lattice spacings of solid solutions, in  $\alpha$  iron, 10: 2087(J)
- neutron-capture  $\gamma$ -ray spectrum, 10: 2174(J)
- neutron resonances, 10: 3655
- paramagnetic resonance in  $\text{Al}_2\text{O}_3$ - $\text{Cr}_2\text{O}_3$  solid solutions, 10: 2943(J)
- physical and metallurgical properties, 10: 2434
- polarographic determination in Ca, 10: 609
- zero charge potentials in, measuring methods, 10: 2088(J)

## Chromium alloys

(See also Aluminum-chromium-iron alloys.)

- corrosion and oxidation resistant properties of diffusion coatings of, 10: 842
- corrosion by liquid U-Bi alloys, 10: 2440(R)
- high-temperature properties and phase studies, 10: 1392(R)
- melting process for higher quality super, 10: 199(J)

## Chromium-aluminum-iron alloys

- effect of adding Pt, Pa, Nb, Mo, Ta, W, on oxidation resistance and tensile properties, 10: 834

## Chromium-aluminum-silicon coatings

- for molybdenum, microstructure and oxidation, 10: 2063

## Chromium-beryllium alloys

- crystal structure of  $\text{CrBe}_{12}$ , 10: 911(J)

## Chromium-boron-iron-nickel systems

- reactor safety rods of, stability, and mechanical and magnetic properties, 10: 1552
- tensile and impact test results on irradiated, 10: 1823

## Chromium carbonyls

- infrared spectra and thermodynamic properties, 10: 2213(J)

## Chromium chlorides

- labeled, paper electrophoretic determination of, in rat serum, 10: 83

## Chromium coatings

- corrosion and oxidation resistance of, for stainless steel, 10: 842

## Chromium-cobalt alloys

- scaling, at high temperatures and microstructure, 10: 1373(R)

## Chromium-copper alloys

- scaling, effect of Cr additions on, 10: 2078

## Chromium hydroxides

- aging of precipitates, 10: 2009(J)

## Chromium ions

- coulometric titration of  $\text{Cr}^{6+}$  with  $\text{U}^{4+}$ , 10: 752(J)
- radiation-induced reduction of  $\text{Cr}^{6+}$  in acetate solutions, 10: 2655

## Chromium-iron alloys

- corrosion by Dowtherm A-alkylbenzene mixtures, 10: 3005
- impact properties of vacuum melted, 10: 1833(J)
- scaling, effect of Cr additions on, 10: 2078

## Chromium-iron-manganese alloys

- rupture, tensile, and thermal shock properties, 10: 826(R)

Chromium isotopes  $\text{Cr}^{48}$ 

- decay and  $\gamma$  spectrum, 10: 358(J)

Chromium isotopes  $\text{Cr}^{51}$ 

- bremsstrahlung spectrum from, 10: 1604(J)
- decay, and energy levels of  $\text{V}^{51}$ , 10: 2932(J)
- inner bremsstrahlung- $\gamma$ -ray directional angular correlation, 10: 320(R)

Chromium isotopes  $\text{Cr}^{55}$ 

- gamma spectra, 10: 3243

## Chromium-molybdenum alloys

- cermets of, with  $\text{Al}_2\text{O}_3$ , fabrication, testing, and properties, 10: 1783(J)

## Chromium-molybdenum-titanium alloys

- preparation, mechanical properties, heat treatment, and microstructure, 10: 1394(R)

## Chromium-nickel alloys

- corrosion by Dowtherm A-alkylbenzene mixtures, 10: 3005
- diffusion studies, 10: 1812(R)
- scaling, effect of Cr additions on, 10: 2078

## Chromium-nickel steel

- bainite transformation in, x-ray-diffraction analysis, 10: 850
- transformation diagrams, comparison of, 10: 1382

## Chromium-silicon systems

- high-temperature properties and phase studies, 10: 1392(R)

## Chromium-titanium alloys

- high-temperature properties and phase studies, 10: 1392(R)

## Chromium-uranium alloys

- beta- $\alpha$  transformation of U in stabilized, 10: 1648(J)
- constitution diagrams, isothermal transformation of  $\beta$ - to  $\alpha$ -U in, 10: 879(J)
- linear thermal expansion and thermal conductivity from 20 to 800°C, 10: 2716
- thermal conductivity, 10: 3616

## Chromosomes

(See also Genetics; Mitosis.)

- desoxyribose nucleic acid synthesis in, in Tradescantia, tracer study, 10: 2607(J)
- effects of irradiation on, of Drosophila, 10: 33(J)
- effects of radiation on, 10: 38(J)
- protection against radiation injuries conferred by sodium hydrosulfite and BAL, 10: 1197(J)
- radioinduced pycnosis of, effects of oxygen tension on, 10: 528(J)

## Church Rock Area (N. Mex.)

- exploration, 10: 2063

## Circuits

(See also Coincidence circuits; Timing circuits.)

- design, for discharging capacitors, 10: 1672(P)
- development for synchrocyclotron particle detection, 10: 2907(J)
- electronic, design, 10: 1(R)
- flip-flop, storage loop, and pulse generator, design, 10: 2752(R)
- for measurement of Hall and magneto-resistive effects on irradiated graphite, 10: 2320
- for measurement of time intervals  $\sim 10^{-10}$  sec, 10: 237(J)
- in oscilloscopes, modification, 10: 3089(P)
- for polarity selection, design, 10: 3088(P)
- sweep, design of economical, fast, 10: 933(J)

## Circulating fuel reactors

(See Fluid fuel reactors.)

## City Slicker Claim (Colo.)

- mineralogy, 10: 1352

## Civilian defense

(See also Radiological defense.)

- passive defense measures for naval shore establishments, 10: 503

## Cladding

(See Beryllium (clad); Beryllium-uranium alloys (clad).)



## Claire Marie Mine (Colo.)

exploration, 10: 1363(J)

## Clays

(See also Kaolins.)

gamma scattering, 10: 2549

ion exchange reactions with fission products, effects on ground disposal of wastes, 10: 1327(R)

pelagic, distribution of radioelements in, 10: 1802(J)

## Clinton Labs., Oak Ridge, Tenn.

progress reports, 10: 1288(R)

progress reports of Chemistry Div., 10: 3434

progress reports of Physics Section, 10: 3659(R)

## Cloud chambers

cylinder casting of Astrolite for use in, 10: 1468

design of high-pressure diffusion-type, 10: 966(J)

particle disintegration in, 10: 301(J)

refinements and use in study of heavy unstable particles, 10: 2127

simulation and experimental studies, 10: 3854

particle life time measurement with, 10: 304(J)

particle track measurements, curvature errors due to scattering, 10: 2241

performance of, for measurements of aerosol particle sizes, 10: 210

track measurement of curvature, length, and spatial direction by stereoscopic means, 10: 967(J)

## Clutches

(See Magnetic clutches.)

## Coal Canyon Area (S. Dak.)

geology, 10: 1789(J)

## Coal deposits (Idaho)

occurrence in Caribou Mts, 10: 151

## Coal deposits (Penna.)

radioactivity, 10: 2065

radioactivity of, in western Penna., uranium occurrence, 10: 152

## Coal deposits (Wyo.)

occurrence in Caribou Mts, 10: 151

## Coatings

(See also specific coatings e.g. Chromium coatings; Copper coatings.)

oxidation-resistant, for Mo, development of, 10: 827

oxidation-resistant, for Mo, testing, microstructure, 10: 863

## Cobalt

hydrolysis of aqueous solutions of ammonia complexes, deuterium isotope effect on, 10: 1759(J)

ion exchange on resins, effects of cross linkage on, 10: 1304(J)

lattice spacings of solid solutions, in  $\alpha$  iron, 10: 2087(J)

metabolism in dogs and chicks, tracer study, 10: 2007(J)

neutron-capture  $\gamma$ -ray spectrum, 10: 2174(J)

neutron reactions (n,p) at 14 Mev, cross sections, 10: 338(J)

neutron scattering resonances, 10: 3650(R)

neutron total cross sections, 10: 3656

nuclear properties, as a neutron reflector, 10: 3654(R)

plastic deformation, 10: 184(R)

separation from Ni by solvent extraction with  $\text{SCN}^-$ -hexone, 10: 2669(J)

solvent extraction, 10: 1781(R)

tissue distribution in dogs, tracer study, 10: 1206(J)

tissue distribution of, in rats, tracer study, 10: 42(R)

## Cobalt alloys

(See also specific cobalt alloys, e.g. Aluminum-cobalt alloys; Chromium-cobalt alloys.)

corrosion in 500 and 600°F water, 10: 1806

preparation and thermal properties of heat resisting, 10: 1397

rupture, tensile, and thermal shock properties, 10: 826(R)

welding hafnium to Stellite, preliminary attempts, 10: 2438

## Cobalt-aluminum alloys

hardness, temperature dependence of, constitution diagrams, 10: 2090(J)

## Cobalt-aluminum oxide systems

oxidation, 10: 786

## Cobalt carbonyl hydrides

hydrogen bonding in, molecular orbital treatment, 10: 648(J)

## Cobalt chlorides

hydrates, heats of solution in organic solvents, 10: 2256(R)

## Cobalt-chromium alloys

scaling, at high temperatures and microstructure, 10: 1373(R)

## Cobalt(III) complexes

hydrolysis of aqueous, deuterium isotope effect on, 10: 1759(J)

## Cobalt(II) fluorides

entropy and heat capacity, 10: 1265(J)

## Cobalt(III) fluorides

preparation and stability, 10: 3534

## Cobalt hydroxides

aging of precipitates, 10: 2009(J)

## Cobalt ions

electroreduction of  $\text{Co}^{2+}$ , kinetics and reaction mechanism, 10: 2628

oxidizing properties of  $\text{Co}^{3+}$ , 10: 1285(J)

Cobalt isotopes  $\text{Co}^{57}$ 

decay, 10: 2935(J)

Cobalt isotopes  $\text{Co}^{58}$ 

electron capture to positron emission ratio, 10: 2142(R)

Cobalt isotopes  $\text{Co}^{59}$ 

decay scheme, 10: 474(J)

Cobalt isotopes  $\text{Co}^{60}$ 

air scattering of  $\gamma$  rays from, comparison of theory and experiment, 10: 3680

built up films of stearate, preparation of, 10: 1106(J)

containers for, 10: 3128

electron spectrum and energy levels in  $\text{Ni}^{60}$  from, 10: 1949(J)

gamma field, comparison to radium field, 10: 1507(R)

gamma radiation, circular polarization, 10: 2934(J)

gamma radiation from, measurement of, 10: 1101

gamma rays, cross sections in Pb for, 10: 1911(J)

gamma rays from, effect on biological activity of retina, 10: 527(J)

hectocurie teletherapy machine using, isodose charts for, 10: 544

localization of internally administered by teleradiography using  $\text{Tm}^{170}$  as source, 10: 2599(J)

low-energy scattered radiation inside cylindrical sources of, 10: 1105(J)

radiographic uses for detecting internal defects in casting, 10: 3128

radiometric determination in the presence of  $\text{Fe}^{59}$ , coincidence technique, 10: 1473(J)

radiotherapeutic uses, 10: 2003(J), 2004(J)

standard sources of, preparation by electrodeposition, 10: 1607(J)

- Cobalt isotopes  $\text{Co}^{60}$  (cont'd)
- teletherapy units using, personnel protection, 10: 1711(J)
  - urinary and biliary excretion in dogs, 10: 1205(J)
  - use in a revolving radiotherapy unit, 10: 48(J)
- Cobalt isotopes  $\text{Co}^{61}$
- disintegration, 10: 1954(J)
- Cobalt nitrates
- hydrates, heats of solution in dimethyl formamide, 10: 2256(R)
- Cobalt-platinum alloys
- phase studies, x-ray-diffraction measurements, 10: 2082
- Cockcroft-Walton accelerators
- drift tube design, 10: 3045
  - strong-focusing, properties of, 10: 3045
- Coefficients
- (See Constants and conversion factors.)
- Coffinites
- synthesis by hydrothermal process, 10: 2672(J)
- Coincidence circuits
- design for double-grid, for 0.1 $\mu$  sec pulses of low amplitude, 10: 2463
  - performance of, in measuring first forbidden, non-unique  $\beta$  transitions in  $\text{Re}^{186}$ , 10: 3380
- Coincidence counters
- design of  $\beta$ - $\gamma$ ,  $\gamma$ - $\gamma$ , and x-ray- $\gamma$ , 10: 3852(R)
  - design of high transmission coincidence spectrometer for electron spectroscopy, 10: 968(J)
  - design of scintillation, and application to  $\text{B}^{10}(\text{d,p})\text{B}^{11}$  reaction, 10: 2820(J)
  - scintillation, sorter for pulses from, 10: 2125(J)
- Coincidence measurements
- of fast neutrons, stilbene scintillator spectrometer for, 10: 2119(J)
  - $\gamma$ -ray-transition lifetimes, 10: 1109(J)
  - methods, 10: 3652(R)
- Coke
- preparation and properties, 10: 2022
- Collagen
- fixation, for microscopic examination, 10: 1156(J)
- Collapse Area (Utah)
- geology and mineralogy, 10: 1785(R)
- Colloids
- (See also Aerosols; Disperse Systems; Drops; Gold (colloidal); Silicon oxides (colloidal).)
  - flocculations and streaming potentials in aqueous systems, 10: 53
  - uptake by macrophages in vitro, tracer study, 10: 3100
- Colorado
- exploration and occurrence of U minerals, 10: 3130(R)
  - exploration of Red Canyon Quadrangle in Mesa and Montrose Cos., 10: 159(J)
  - geology of Egnar Quadrangle in Dolores and San Miguel Cos, 10: 158(J)
  - geology of the Joe Davis Hill Quadrangle in Dolores and San Miguel Cos., 10: 156(J)
  - geophysical exploration of Huerfano Embayment, Los Animas Arch, and La Veta Pass Area in, 10: 801
  - uranium deposits in Mesa and Montrose Cos., areas favorable for, 10: 1361(J)
- Colorado (Gilpin Co.)
- uranium distribution in Eureka Gulch Area in, 10: 1363(J)
- Colorado (Mesa Co.)
- geology of Calamity Mesa Quadrangle in, 10: 157(J)
  - geology of Gateway Quadrangle in, 10: 1359(J)
- Colorado (Moffat Co.)
- geophysical exploration of Skull Creek Area in, 10: 1351
- Colorado (Montezuma Co.)
- photogeologic map of Aneth Quadrangle in, 10: 162(J), 166(J)
- Colorado (Montrose Co.)
- geology of Atkinson Creek Quadrangle in, 10: 1360(J)
  - geophysical exploration, geology, and U distribution, 10: 806
- Colorado (San Miguel Co.)
- exploration of Hamm Canyon Quadrangle in, 10: 155(J)
  - geology of Gypsum Gap Quadrangle in, 10: 154(J)
- Colorado Plateau
- geologic investigations for radioactive deposits in, 10: 2067(R)
- Colorado River Basin (Utah)
- northwest rim, exploration, 10: 800
- Columbia River
- radiobiological-ecological survey, 10: 3409(R)
  - radiobiological survey, 10: 513(R), 2242(R), 2595(J)
- Columbia Univ., New York
- progress reports on bearing-materials testing, 10: 3354(R)
  - progress reports on chemical environment of pitchblende, 10: 150(R)
  - progress reports on food irradiation, 10: 515(R)
  - progress reports on the collapse features of Temple Mountain U area, 10: 1785(R)
- Columbia Univ., New York. Mineral Beneficiation Lab.
- progress reports on recovery of U from Chattanooga shales, 10: 1300(R), 1301(R)
- Columbia Univ., New York. Nuclear Physics Labs.
- progress reports on research, 10: 3852(R)
- Columbia Univ., New York. Radiological Research Lab.
- progress reports, 10: 516(R)
- Columbia Univ., New York. School of Mines
- physical and chemical properties of chloride systems, 10: 578
- Columbium
- (See Niobium.)
- Column packing
- for  $\text{UF}_6$  distillation, holdup and flooding behavior, 10: 3796
- Comminution
- (See also Grinding.)
  - high velocity impact, chemical effects, and ball mill studies, 10: 1781(R)
- Complexes
- (See Benzene, nitro- complexes; Chelate complexes; Cupferron complexes; Hydroaromatic complexes; Iodate complexes; Metal complexes; Picric acid complexes.)
- Complexone(III)
- (See Acetic acid (ethylenediamine) tetra-.)
- Compounds
- (See Actinide compounds; Addition compounds.)
- Compressible flow
- (See also Gas flow; Incompressible Flow.)
  - boundary layer equations for two dimensional laminar, and skin friction and heat transfer for, 10: 127
  - mathematical analysis of, in presence of shocks, 10: 3801
- Compton effect
- linear energy transfer distribution, 10: 3881
- Computers
- (See also Mathematics; Mercury delay lines; Reactor simulators.)

## Computers (cont'd)

- applications to chemical problems, 10: 245
- codes for nuclear reactor problems, bibliography, 10: 1868
- coding, programming, and operation of Oracle, 10: 3211(R)
- coding for three-region, two-group, two-dimensional reactor calculations, 10: 3317
- delay circuits for use with analog, 10: 3139
- design, 10: 2751(R)
- design and development, 10: 2752(R)
- design of, for solving transmission line equations, 10: 3202
- design of circuits for, 10: 2788(R)
- diode simulation of a function of two variables, 10: 3838
- Electrodata Datatron program for least squares analyses of variance, 10: 3298
- error in computation by digital, analysis, 10: 2806
- partial differential equations solvable by, 10: 3649(R)
- programming, compiler for UNIVAC, 10: 235
- programming, one-space-dimensional multigroup equations for IBM 650, 10: 2804
- starting routine for the C.S.L.R.O. Mark I, 10: 1861(J)
- theory and design of analog, for determination of particle energies from nuclear reactions, 10: 325(J)

## Conconino Sandstone (Utah)

- geology, 10: 1785(R)

## Concrete aggregates

(See also Concretes.)

- shielding properties and feasibility for HRT shield, 10: 3744

## Concretes

(See also Cements; Concrete aggregates; Reactor materials; Shielding materials.)

- attenuation of 275- to 525-kv x radiation in, 10: 1960(J)
- gamma attenuation from ORNL Research Reactor, 10: 2561
- neutron attenuation, theoretical determination, 10: 1086
- preparation of high unit-weight, 10: 482(J)
- radiation-shielding efficiency, 10: 3075(P)
- shielding by, construction test of, 10: 2538
- shielding properties, for MTR Mockup, 10: 2525
- shielding properties for HRE, 10: 3699
- temperature effects and decontamination, 10: 779
- thermal stresses and shielding properties, 10: 2527

## Condensation

- of vapors near saturation point, study by optical and micropolarization method, 10: 2040(J)

## Conemaugh Formation (Penna.)

- geology, radioactivity of coals and associated rocks in, 10: 2065
- geology and coal deposits in, 10: 152

## Connecticut. Univ., Storrs

- progress reports on heat transfer and pressure drop for air flowing in internally finned tubes, 10: 131(R)

## Connective tissue

- morphology, 10: 3327(R)

## Connectors (electric)

(See also Cables; Disconnects; Electric Power.)

- design for connecting Ti to other metals, 10: 2731

## Constants and conversion factors

(See also Atomic constants; Danger coefficients; Dielectric constants, Multiplication factor; Virial coefficients.)

## Constants and conversion factors (cont'd)

- fundamental physical constants, revised table, 10: 1218
- isodose curves for use with hectocurie teletherapy machine, 10: 544
- Madelung constant, correction to, 10: 1869(J)
- nuclear, calculations of, 10: 3671

## Control

(See Inspection and control; Remote-control equipment.)

## Control systems

(See Electric control systems; Reactor control systems.)

## Convection

(See also Heat transfer.)

- heat transfer rates and temperature distribution in systems with volume heat sources, 10: 130

- laminar flow, 10: 771(J)

## Convection (forced)

- theory, and heat transfer in reactors, 10: 1337
- velocity distributions in cylindrical channels, 10: 2054

## Convection (free)

- heat transfer by, between parallel plates and in narrow annuli, theoretical and experimental investigation, 10: 2054
- theory and experiments in fluids with a volume heat source, 10: 129

## Conversion electrons

(See also Beta particles; Internal conversion.)

- angular correlation coefficients, calculation, 10: 247(J)
- angular correlations involving, theory, 10: 489
- correlation of  $\text{Hg}^{197}$  and  $\text{Ta}^{181}$ , 10: 1957(J)
- from electric excitation of  $\text{Ta}^{181}$ ,  $\text{Au}^{197}$ , and  $\text{Pt}^{190}$ , 10: 2153(J)

## Conversion factors

(See Constants and conversion factors.)

## Copper

- adsorption of organic compounds from aqueous solutions by, 10: 109
- alpha reactions ( $\alpha, p$ ), at 40 Mev, 10: 2175(J)
- colorimetric determination in  $\text{UF}_4$ , 10: 3426
- colorimetric determination in uranyl ammonium phosphate precipitates, 10: 3612
- corrosion in  $\text{H}_2\text{O}$ , effect of borax or mercaptobenzothiazole on, 10: 2704
- crystal structure, effects of neutron irradiation, 10: 3133
- determination in  $\text{UF}_4$  by chemical and spectrographic analysis, 10: 3456
- ductility, effects of brittle skins on, 10: 2723
- elastic scattering of  $\gamma$  rays in, cross sections for, 10: 2916(J)
- electrical resistivity of cold-worked, 10: 2497(R)
- electrodeposition on C, 10: 2455
- excitation potential determination and range-energy relations, 10: 311(J)
- gamma reactions ( $\gamma, p$ ) at 19.0 to 30.5 Mev, angular distribution and yield, 10: 1068(J)
- grain-boundary diffusion in Al, 10: 1814(R)
- hardness, effects of radiation on, 10: 3368(R)
- hardness recovery in electron-irradiated, 10: 3405(R)
- hot, reaction with O and oxides of N in separation of gases, 10: 3486
- ion exchange on resins, effects of cross linkage on, 10: 1304(J)
- ion exchange separation from plant waste solutions, 10: 3491
- ionization of K shell by  $\alpha$  particles, 10: 2871(J)
- $\mu$  mesonic x-ray spectra, 10: 1123(J)



- Copper (cont'd)
- neutron polarization in elastic scattering, 10: 439(J)
  - neutron reaction (n,2n) excitation cross section, calculation using compound nucleus formation, 10: 1934(J)
  - neutron reactions (n,p) at 14 Mev, cross sections, 10: 338(J)
  - photon elastic scattering cross-section measurement, 10: 434(J)
  - photoneutrons produced in, energy and angular distributions of, 10: 1899(J)
  - proton scattering cross section, 10: 1009(R)
  - pulse annealing of cyclotron-irradiated, 10: 3738
  - reactions with O<sub>2</sub>, O<sup>18</sup>-isotope effect in, 10: 594(J)
  - spectrophotometric determination in HCP Process solutions, 10: 3533
  - static potential measurements, 10: 887
  - tensile properties of irradiated wires, 10: 3307(R)
  - zero charge potentials in, measuring methods, 10: 2088(J)
- Copper alloys
- (See also specific copper alloys, e.g. Aluminum-copper alloys; Aluminum-copper-magnesium alloys.)
  - order-disorder in, x-ray studies, 10: 843
- Copper-aluminum alloys
- grain structure, effects of vibrations on, 10: 180
- Copper-aluminum-magnesium alloys
- strength and creep properties of 2024-T3 at elevated temperatures, 10: 2721
- Copper-beryllium alloys
- precipitation-hardening reaction in, effects of neutron irradiation on, 10: 2919(J)
  - tensile properties, 10: 836(R)
- Copper-beryllium compacts
- mechanical properties and sintering, 10: 3614
- Copper bromides
- mass spectra, 10: 2107(J)
- Copper Chief Mine (Nev.)
- exploration, 10: 1358
- Copper chlorides
- mass spectra, 10: 2107(J)
- Copper-chromium alloys
- scaling, effect of Cr additions on, 10: 2078
- Copper coatings
- (See also Zirconium (Cu clad).)
  - electrodeposition on Be powders, 10: 3614
- Copper electrodes
- electric discharge in vacuum, high frequency, 10: 2458
- Copper Flower Mine (Nev.)
- exploration, 10: 1358
- Copper foils
- electron energy losses in, 10: 1442(J)
- Copper-gold alloys
- Hall Effect in, 10: 1385
  - radiation effects, 10: 3368(R)
- Copper-gold compacts
- diffusion, effects of radiation on, 10: 2554
- Copper halides
- mass spectrographic analysis of CuI, 10: 3028(R)
- Copper iodides
- mass spectra, 10: 2107(J)
- Copper isotopes Cu<sup>63</sup>
- positron and  $\gamma$  emission, 10: 1115(J)
- Copper isotopes Cu<sup>60</sup>
- energy levels, possibility of isomeric, 10: 1506(R)
- Copper isotopes Cu<sup>63</sup>
- cross section measurements for electro- and photodisintegration, 10: 356(J)
  - photon reactions ( $\gamma$ ,p), proton yield relative to Cu<sup>65</sup>, 10: 1506(R)
  - proton reaction (p,n) thresholds and neutron yield, 10: 397(J)
- Copper isotopes Cu<sup>65</sup>
- fluorescence yields, K-series, 10: 1523(J)
  - photon ( $\gamma$ ,p), proton yield relative to Cu<sup>63</sup>, 10: 1506(R)
  - proton reaction (p,n) thresholds and neutron yield, 10: 397(J)
- Copper-manganese alloys
- scaling, effect of Mn concentration on, 10: 2078
- Copper-nickel alloys
- Hall Effect in, 10: 1385
  - nickel x-ray-absorption spectrum from, irradiated with neutrons, 10: 1020(J)
- Copper-nickel compacts
- diffusion, effects of radiation on, 10: 2554
- Copper oxides
- oxidation, effects of O pressure and temperature, 10: 2086(J)
  - preparation from oxidation of solid Cu, 10: 3264(J)
- Copper sulfate-sulfuric acid systems
- corrosive effects on weld deposits, 10: 147
- Copper-uranium alloys
- alloying theory, 10: 3361
- Copper-zirconium alloys
- tensile properties, 10: 1804
- Cornell Aeronautical Lab., Inc., Buffalo
- progress reports on development of heat-resisting alloys, 10: 835
- Corrosion
- (See also Electrochemical corrosion.)
  - anticorrosion admixtures to oils, tracer study, 10: 2041(J)
  - catalytic, of palladium and platinum surfaces, 10: 2061(J)
  - intercrystalline, of high purity aluminum and effects on grain boundary, 10: 3191(J)
  - measurements of, experimental arrangements for, 10: 3368(R)
  - of metals at low and medium temperatures, theory, 10: 2060(J)
  - method of measurement of rate of, of iron in high-temperature water; use of Kirkendall method, 10: 2058
  - methods of measurement, equipment for, 10: 2702
  - radiation effects, 10: 3480
  - rate calculations, nomograph for, 10: 2708(J)
  - of stainless steel, effects of radiation on, 10: 2252(R)
  - of stainless steel, protection by anodic polarization, 10: 793(J)
- Corrosion films
- chromatographic analysis for Al, 10: 3107
  - on iron and iron alloy surfaces, physico-chemical conditions of diffusion of, 10: 794(J)
- Corrosion loops
- design, for studies on radiation effects on organic liquids, 10: 2026
- Cortex
- (See Adrenal glands.)

## Cortisone

- effects on growth of transplanted tumors in mice, 10: 2600(J)
- effects on lung radiosensitivity in rats, 10: 3166
- physiological effects on rat thymus, 10: 3787

## Cosmic electrons

- intensity and zenith-angle variation with altitude, 10: 1423(J)
- triplets produced by, cross sections for, 10: 1848(J)

## Cosmic mesons

- intensities in east-west plane of positive and negative  $\mu$ , near geomagnetic equator, 10: 219(J)

## Cosmic mesons (K)

- decay and mass, 10: 1483(J)

Cosmic mesons ( $\mu$ )

- capture by C and O and resultant x-ray emission, 10: 1484(J)
- decay ( $\mu$ -e), relation to positive temperature effect in cosmic radiation, 10: 216(J)
- differential range spectrum, absolute low-energy, 10: 988(J)
- momentum spectrum of, near sea level at 24°N, 10: 217(J)
- positive-negative difference of, and relation to primary collisions, 10: 989(J)

## Cosmic neutrons

- intensity variation with geomagnetic latitude, 10: 1422(J)

## Cosmic particles

(See also Electrons; Mesons.)

- energy loss measurement, 10: 1595(J)
- heavy unstable, study of, 10: 2101(J)
- origin of, lectures by B. Rossi on, 10: 213(J)
- range-energy relation and mass determination in cloud chambers, 10: 1506(R)
- singly charged unstable, cloud chamber observation of, 10: 212(J)

## Cosmic protons

- energy spectrum at sea level, 10: 903(J)
- momentum spectrum and pressure coefficient at sea level, and velocity selector for measurement of, 10: 1847(J)

## Cosmic radiation

- analysis of cloud chamber observations, 10: 212(J)
- barometer effects on the hard component, 10: 1424(J)
- charge spectrum, at geomagnetic latitude 41°, 10: 2758
- data, analysis of Echo Lake, 10: 1411(R)
- diurnal variation in intensity of, at Ottawa, 10: 215(J)
- effect of latitude on, 10: 2764(J)
- energy spectrum determinations, 10: 214(J)
- formation of  $P^{32}$  from atmospheric A by, 10: 2763(J)
- geomagnetic latitude effects on the nuclear and meson components at sea level, 10: 2759(J)
- helium hyperfragment in, nonmesonic decay, 10: 2099(J)
- hyperfragments in, disintegration of, 10: 904(J)
- intensities of low-Z components, 10: 2097(J)
- intensity, 27-day recurrence of, 10: 906(J)
- intensity variation with altitude, 10: 2760(J)
- K-mesonic decay of stopped secondary in pellicle stack exposed to, 10: 286(J)
- observations on stars and heavy primaries recorded in emulsions flown at rocket altitudes, 10: 2760(J)
- origin and time variations, 10: 908(J)
- origin of, lectures by B. Rossi on, 10: 213(J)

## Cosmic radiation (cont'd)

- positive temperature effect in, and  $\mu$ -e decay, 10: 216(J)
- primary collisions in, and relation to positive-negative muon difference, 10: 989(J)
- production of  $\Xi$  particles with two  $\Theta^0$  particles, 10: 2096(J)
- secondary maxima in the Rossi transition, 10: 1426(J)
- sources of  $\lambda = 3.2$  cm wave length, observation and results of, 10: 1421(J)
- star production, 10: 2501(R)
- S star, analysis of secondaries in, 10: 905(J)
- from sun and existence of field-free cavity near sun, 10: 2095(J)
- transition, secondary maxima in, 10: 1425(J)
- triplets in, cross sections for, 10: 1848(J)
- velocity spectrum, at 13 grams atmospheric depth, 10: 2757

## Cosmic-ray spectra

- spectrophotometric investigations, 10: 1421(J)

## Cosmic showers

(See also Cosmic Radiation.)

- Cherenkov radiation accompanying, observation, 10: 2765(J)
- in iron and lead, cloud chamber study, 10: 2762(J)
- monitoring equipment, 10: 3329(R)

## Cosmotron

(See Brookhaven Synchrotron.)

## Countercurrent separation processes

- calculation methods and performance of columns for deuterium separation, 10: 1757(J)
- mass transfer between liquid drops and continuous liquid phase, 10: 1733(J)

## Counting devices

(See also Radiation detection instruments; Radiation detectors; Scalers.)

- subtractive dekatron, for impulses from two Geiger counters, 10: 1890(J)

## CP-Reactors

(See Argonne Research Reactors; Experimental Breeder Reactor.)

## Craven Canyon Area (S. Dak.)

- exploration, geology, and U and V occurrence, 10: 1789(J)

## Creep

- design of equipment for measuring, in MTR, 10: 781
- measurement, apparatus for rates  $5 \times 10^{-6}$  in./sec, 10: 2465
- measurement of, at high temperatures, equipment and procedures, 10: 14
- theory, 10: 185, 186

## Critical assemblies

(See also Neutron sources; Reactors.)

- description of Los Alamos, and delayed neutron studies with, 10: 384(J)
- design of zero power reactor experiment (ZPR-III) for study of fast power breeder reactors, 10: 3226
- neutron diffusion, 10: 2491
- neutron flux distribution and  $U^{235}$  critical mass in  $H_2O$ -moderated, with  $D_2O$ , Be, and  $H_2O$  reflectors, 10: 3230
- parameter measurements on slightly enriched  $U-H_2O$ , 10: 3403
- time behavior of subcritical, 10: 382

## Critical experiments

(See KAPL Intermediate Power Breeder Critical Experiments.)

## Criticality studies

(See also Multiplication factor.)

## Criticality studies (cont'd)

- calculated and experimental values for SPERT-I, 10: 3825
- critical mass needed to over-ride Xe in reactors, 10: 3728
- design of Fast Exponential Experiment for, 10: 3384
- Laplacian of one-group diffusion theory, procedure for estimating, 10: 1060
- for multiplying-slab reactor with non-multiplying reflector, 10: 3727
- parameter measurements on slightly enriched U-H<sub>2</sub>O lattices, 10: 3403
- sizes and multiplication numbers for untamped rectangular parallelepipeds, 10: 3724
- on storage vessels containing U solutions, 10: 3754
- in untamped conical vessels, mathematical analysis, 10: 3753

## Cross sections

(See also specific cross sections, e.g. Meson cross sections; Neutron cross sections.)

- temperature and energy dependence, mathematical analysis, 10: 3665

## Cryogenics

- bibliography, 10: 2093

## Crystal detectors

- calibration of, for neutron dosimetry, 10: 951
- preparation and properties of, 10: 221
- sulfur, design and operation, 10: 1680(P)

## Crystal structure

(See also Preferred orientation.)

- Born theory and its application to transition metal oxides, 10: 222
- of elements at zero pressure, table, 10: 909
- lattice-energy determination, Madelung constants for, 10: 2768(J)
- theory of NIAs and Ni<sub>2</sub>In types, 10: 1432(J)
- twinning, elastic and inelastic, in metals, 10: 868(J)
- of uranium, studied by x rays, 10: 1647(J)

## Crystals

(See also specific crystals, e.g. Alkali metal halide crystals; Aluminum crystals.)

- bending for x-ray-diffraction studies, 10: 3291
- electrostatic energy, correction to Madelung constant in calculation of, 10: 1869(J)
- irradiated, effects on x-ray diffraction, 10: 1975
- paramagnetic resonance absorption, anisotropy measurements of, 10: 310(J)
- quantum mechanics at low temperature, 10: 1629(J)
- radiation damage in, x-ray-diffraction analysis, 10: 1849
- states of disorder and transport processes in, 10: 1431(J)
- structure determination by spin-echo modulation between nuclei, 10: 1024(J)
- thermal annealing, formation of colloidal particles during, 10: 3738
- valence and inner electron exchange interactions, 10: 1433(J)
- x-ray scattering by, and thermal vibrations of atoms in, 10: 1436(J)

## Cupferron complexes

- optical properties and preparation, 10: 3290
- with U<sup>3+</sup>, polarographic behavior, 10: 751(J)

## Curites

- crystallography, 10: 2066

## Curium

(See also Transuranic elements.)

- determination, 10: 3433

## Curium (cont'd)

- determination in fission products, 10: 1230
- electrodeposition from acid solutions, 10: 3275
- spectral lines from 3100 Å to 4200 Å, 10: 2353
- uptake in liver and bone, comparison with other elements, 10: 2241

## Curium isotopes

- formation by neutron irradiation of Am<sup>241</sup>, 10: 3024

## Current regulators

(See also Voltage regulators.)

- design, for calutron application, 10: 3140
- design and construction of low-range, 10: 561

## Curtis formation (Colo.)

- geology, 10: 1351

## Cutler Formation (Colo.)

- geology, 10: 155(J), 156(J), 157(J)

## Cutler Formation (Utah)

- anomalous radioactivity in, 10: 806

## Cutting tools

- continuous automatic control of cutters for metal wires and ribbons, 10: 1661(P)
- evaluation of Mo boride, for turning Ti-150A, 10: 194

## Cyanide ions

- exchange with W(CN)<sub>8</sub><sup>3-</sup> and W(CN)<sub>8</sub><sup>4-</sup> ions in aqueous solutions, 10: 73(J)

## Cyclohexane

- luminescence of mixtures of, produced by Co<sup>60</sup> γ rays, 10: 1600(J)
- purification for spectrochemical analysis, 10: 3245(J)

## 1,2-Cyclohexanedione dioxime

- 4-methyl- and 4-isopropyl-, analytical uses for determination of Pd and Ni, 10: 1742(J)

## Cyclohexanones

- solvent properties for TTA, 10: 2333

## Cyclone separators

- development of single and multiple, for industrial applications, 10: 2049(J)
- single vane, performance and design, 10: 729(J)

## Cyclotrons

(See also Synchrocyclotrons.)

- background, improvements in, 10: 3664
- beam polarization of UCRL, 10: 1009(R)
- cloverleaf, history of development, 10: 2185(J)
- condenser for, design of rotating, 10: 2498
- constant frequency, design, construction, and theory, 10: 3240
- cyclotron electric discharge in insulators and capacitors for, 10: 3620
- design for irradiation experiments, 10: 3322
- electrical parameters from odd shapes, etc. in, calculator for determining, 10: 3202
- high temperature target box and beam profile unit, development, 10: 3405(R)
- ion source for 184-in., 10: 2500(R)
- ion sources, design, 10: 1671(P)
- ion sources for deuterons, 10: 3735
- magnetic field measurement, design of magnetometer, 10: 1447
- modification of 184- and 60-inch UCRL, 10: 1009(R)
- operation and development, 10: 3663
- proton, studies with three-dee three-phase, 10: 1587



## Cyclotrons (cont'd)

- radiofrequency system for cloverleaf, 10: 1082
- radiofrequency system for 184-in., preliminary tests, 10: 3662
- shielding for 184-in., neutron flux distribution, 10: 2500(R)
- timing circuit, design, 10: 3044

## Cylinders

- activation, 10: 3144(R)
- casting astrolite, 10: 1468
- heat transfer in, mathematical analysis, 10: 2696(J)
- heat transfer in an N-medium composit, 10: 2724
- rotating, mass transfer rates, 10: 1733(J)
- temperature and stress formulas for, with heat generated in the material, 10: 128

## Cysteine

- effects on radiation injuries in silkworms, 10: 1999(J)
- protective action from x-radiation effects on rats, 10: 1167
- protective effects of, against radiation injuries in mice, 10: 540(J)

## D

## Dakota Sandstone (Colo.)

- geology, 10: 154(J), 155(J), 156(J), 157(J), 158(J), 159(J)

## Danger coefficients

(See also Multiplication factor; Neutron cross sections.)

- measuring techniques, 10: 3379(R)

## Data recording systems

- for MTR crystal spectrometer, 10: 3158

## Deadwood Formation (S. Dak.)

- uranium formation in, 10: 1789(J)

## Decay schemes

(See also specific modes of decay, e.g. Alpha decay; Beta decay.)

- lectures on, by B. Rossi, 10: 324(J)

## Decontaminating solutions

- effectiveness, effects of zinc nitrate, 10: 3554
- effectiveness for decontaminating protective clothing, 10: 3003
- effectiveness for stainless steel, 10: 3489(R), 3607(R)

## Decontamination

- of air, water, and sewage, 10: 2610

## Decontamination of equipment

- development of reagent for, in Purex Process, 10: 3489(R)
- electrolytic procedures, 10: 2329(R)
- plastic bags and sheeting as protection during, 10: 2247
- procedures employed at KAPL, 10: 1772
- from rupture of U fuel slugs in an autoclave, 10: 2512(R)

## Decoration No. 1. Lode Mine (Wyo.)

- occurrence of radioactive Mn, 10: 148

## Delayed neutrons

- reactivity contribution to homogeneous reactor, calculations, 10: 2531
- studied with Los Alamos critical assemblies, 10: 384(J)

## Densitometers

- design for measuring surface diffusion, 10: 889(R)

## Density

- of radioactive materials, methods of measurement, 10: 2048

## Denver, Univ. Denver Research Inst.

- progress reports on high temperature lubricants and hydraulic fluids, 10: 1333(R)

## Dermatitis

(See Radiodermatitis; Skin diseases.)

## Desert Lake Quadrangle (Utah)

- photogeologic map of, 10: 168(J), 169(J), 814(R), 815(R), 816(R), 817(R), 818(R)

## Desert Valley Prospect (Nev.)

- mineralogy, 10: 1358

## Deuterioorganic compounds

- isotopic effects on mutual solubility of liquid, 10: 2018(J)

## Deuterium

(See also Deuterons.)

- bibliography, 10: 2976
- diffusion of, in Al targets under deuteron bombardment, 10: 1938
- equilibrium constant of the exchange of, between ice and water, 10: 2640(J)
- exchange between hydrogen and water vapor, plant reaction towers for, engineering calculations, 10: 2692(J)
- exchange reactions between trichloroethylene and water, 10: 1749(J)
- exchange reactions with 1-propyl mercaptan and with water, 10: 3462
- exchange with H<sub>2</sub> in the 560°C temperature range, 10: 631(J)
- gamma reactions ( $\gamma, n$ ), cross sections for, 10: 3650(R)
- gamma reactions ( $\gamma, n$ ), threshold for, 10: 3656
- meson ( $\pi^0$ ) formation by 400-Mev neutron reactions in, 10: 276(J)
- photon reactions in,  $\pi^-/\pi^+$  ratio from, 10: 3854
- photoneutrons from, angular distribution, 10: 3655
- photoproduction of  $\pi^0$  mesons from, 10: 273(J)
- production, by the exchange of D between ammonia and H, 10: 2306
- production by exchange between hydrogen gas and liquid ammonia, 10: 2307
- reactions of hot D atoms with H<sub>2</sub>, CH<sub>4</sub>, C<sub>2</sub>H<sub>6</sub>, and C<sub>6</sub>H<sub>12</sub>, 10: 2641(J)
- separation, countercurrent columns for, calculation methods and performance, 10: 1757(J)
- solubility in benzene, heptane, and hexadecafluoroheptane, 10: 2461
- solubility in D<sub>2</sub>O at elevated temperatures, 10: 3121
- ultraviolet radiation from, following  $\alpha$  irradiation, 10: 2786(J)

## Deuterium compounds

- bibliography, 10: 2976

## Deuterium-hydrogen systems

- radiation-induced exchange, 10: 89(J)

## Deuterium ions

(See also Deuterons.)

- dissociation of molecular, in mass spectrometer, 10: 997(J)

## Deuterium-nitrogen systems

- refractive index and liquid-vapor equilibrium data, 10: 629

## Deuterium oxides

(See Water-d; Water-d<sub>2</sub>.)

## Deuterium-titanium systems

- magnetic susceptibility, 10: 3035(R)

## Deuteron beams

- graphite resistivity changes from exposure to, 10: 2317

## Deuteron cross sections

- of beryllium Be<sup>9</sup>, 10: 1578(J)
- determination of (d,  $\alpha$ ) cross sections, 10: 1208(R)

## Deuteron cross sections (cont'd)

nucleon and  $\pi$ -meson collisions, formalism for calculating, 10: 360(J)

## Deuteron sources

design and operation, for use with 184-in. cyclotron, 10: 3735

## Deuterons

(See also Deuterium.)

accelerators for, power loss in, 10: 1586

capture by  $\text{He}^3$ , 10: 1507(R)

disintegration, and isobar role in processes, 10: 2233(J)

effects of bombardment with, on amylase, 10: 31(J)

fission product distribution curves from  $\text{U}^{238}$  bombardment, and fission cross sections, 10: 2240(J)

gamma radiation from bombardment of  $\text{Al}^{27}$  and  $\text{P}^{31}$  by, 10: 1576(J)

meson ( $\pi^-$ ) capture reactions, branching ratios, 10: 2131(J)

mesonic decay of  $\Lambda^-$ , phenomenological study of, 10: 372(J)

neutron production by D-D and D-T reactions, 10: 1508(R)

nuclear reactions  $\text{C}^{13}(\text{d},\text{p})\text{C}^{14}$ ,  $\text{N}^{14}(\text{d},\text{p})\text{N}^{15}$ , and  $\text{N}^{14}(\text{d},\text{n})\text{O}^{15}$  produced by,  $\gamma$  radiation from, 10: 1575(J)

nuclear reactions (d,p), statistical factor influence on cross sections, 10: 2867(J)

photodisintegration, neutron-proton potential and, 10: 1966(J)

photodisintegration at high energies, 10: 390(J)

photoproduction of mesons from, 10: 2852(J)

polarization, in the  $\text{p} + \text{p} \rightarrow \pi + \text{d}$  reaction, 10: 1009(R)

range-energy relation, 10: 2502

ranges of 190-Mev, 10: 2499

reaction with T and attenuation by T and Ti, 10: 2173

reactions with B and C, thresholds and cross sections for, 10: 1579(J)

stability in meson theory, 10: 1137(J), 1621(J)

stripping process theory, 10: 1571(J)

stripping reactions from bombardment of  $\text{Na}_2\text{CO}_3$ , Al, and P with 9-Mev, 10: 1570(J)

uranium fission product yields from bombardment with, 10: 2239(J)

## Dew point

of helium isotope mixtures, 10: 308(J)

## Dextrose

(See Glucose.)

## Diabetes

carbohydrate metabolism in, 10: 1(R)

## Diamond Butte Quadrangle (Ariz.)

map of radiometric observations of Tonto Creek to Globe-Young road in, 10: 1353

## Diamonds

(See also Carbon; Crystal detectors.)

crystal structure changes from neutron irradiation, 10: 3133, 3745(R)

neutron-radiation-induced amorphism in, 10: 2925(J)

## Diborane

(See Boron hydrides.)

## Dielectric constants

formulation for intrinsic, 10: 3369

## Dielectrics

current flow in, 10: 1837(R)

electric conductivity of plastic, during x irradiation, 10: 3739

## Dies

design of, for extrusion of Al alloys, 10: 828(R)

## Diet

(See also Food.)

## Diet (cont'd)

of experimental animals, spectrographic analysis for Ca and Sr, 10: 2973

## Differential equations

canonical, stability of, 10: 3840(J)

## Diffusion

(See also Bonding; Gaseous Diffusion Process; Thermal diffusion.)

of copper activators into ZnS, 10: 595(J)

intermetallic, in powder compacts, measurement and effects of radiation on, 10: 2445

mathematical analysis, 10: 1756(J)

measurement of surface, of metals, 10: 889(R)

measuring methods for vapor expansion and constant of, 10: 898(J)

of metals and non-metals into minerals, tracer studies, 10: 440(J)

## Digestive tract

(See also Gastrointestinal tract.)

## Diketones

(See also Ketones.)

dissociation constants of  $\beta^-$ , 10: 569(R)

polymerization and properties, 10: 1727(R)

structure, 10: 570(R)

## Dilatometers

design and performance for study of densification of powder compacts, 10: 925

design for measurement of thermal expansion of various materials at low temperature, 10: 3824

## Disconnects

(See also Cables; Connectors (electric).)

design and performance for use in process lines, 10: 3477

## Disperse systems

(See also Aerosols; Colloids; Dusts; Particles; Slurries; Solutions.)

interfacial area in liquid-liquid, light transmittance as a measure of, 10: 3289

## Displacement gages

design, for inspection of reactor interplate spacings, 10: 3729

## Disseminated deposits (Colo.)

occurrence in Calamity Mesa Quadrangle, 10: 157(J)

## Distillation

theory of vacuum, of metal mixtures, 10: 2074

## Distillation apparatus

(See also Column packing; Evaporators; Packed Columns.)

accident reports on sodium still at Alplaus, 10: 3198

design and operation for  $\text{UF}_6$  purification, 10: 3796

high-vacuum, cascade-still arrangement, 10: 3085(P)

mass exchange in plate-type, 10: 770(J)

wetted-wall type for water- $\text{d}_2$  production, 10: 202

## 1,2-Dithiolane

photolysis and quantum yields, 10: 2031(J)

## Docosane

neutron attenuation in, efficiency, 10: 2492

## Dodecylamine acetate

adsorption on quartz, electrokinetic potentials, 10: 1229(J)

desorption from solid-liquid interface, 10: 3189(R)

effects on  $\text{Ag}_2\text{S}$  electrodes, 10: 3189(R)

## Dogs

blood plasma Fe levels for beagles, 10: 1160(R)

Dow Chemical Co., Western Div., Pittsburg, Calif.

progress reports, 10: 566(R), 676(R), 677(R), 682(R), 683(R), 685(R), 686(R), 688(R), 689(R), 692(R), 693(R), 694(R), 696(R), 698(R), 699(R), 702(R), 703(R), 708(R), 710(R), 711(R), 712(R), 713(R), 714(R), 715(R), 717(R), 745(R), 1289(R), 2044(R), 3180(R)

progress reports of process development for Oct., 1953, 10: 700(R)

progress reports on recovery of U from industrial  $H_2PO_4$ , 10: 3112

progress reports on U and V recovery, 10: 691(R), 695(R), 697(R)

progress reports on U and V recovery from carnotites, 10: 704(R), 705(R), 706(R)

progress reports on U and V recovery from carnotites and Florida leached zone material, 10: 707(R)

progress reports on U ore processing, 10: 716(R)

progress reports on U recovery, 10: 678(R), 679(R), 680(R), 681(R), 684(R), 687(R), 690(R), 701(R)

Dow Corning Corp., Midland, Mich.

progress reports on fluorine-containing polyethers, 10: 2020(R)

Dowtherm A

(See Biphenyl-phenyl ether systems.)

Dresden Area (Ill.)

environmental factors, survey of, 10: 1151

Driggs Area (Idaho)

coal deposits in, 10: 151

Dripping Spring Quartzite Formation (Ariz.)

geophysical exploration, 10: 1353

Dripping Springs Area (Utah)

geophysical exploration, geology, and mineralogy, 10: 798

Drops

water, ion adsorption by, 10: 1843(J)

Drosophila

dominant lethal mutation and X chromosome elimination after x irradiation of female, 10: 33(J)

genetic systems, 10: 1157(J)

a new mutation of D. melanogaster, 10: 510

radioinduced mutants in, 10: 1(R)

radioinduced mutations, 10: 3095

radiosensitivity, 10: 3327(R)

Dry boxes

design, 10: 3124

Drying apparatus

heat and mass transfer in through-flow, theory, 10: 1733(J)

operation of a Roto-Louvre dryer, 10: 568(R)

Dual-Temperature Process

feasibility, 10: 2308

Ductility

effects of brittle skins on, 10: 2723

Ducts

(See Reactor shield voids.)

Duke Univ., Durham, N. C.

progress reports on EMF measurements in fused salt solutions, 10: 580(R)

DuMont (Allen B.) Labs., Inc. Tube Research Labs., Passaic, N. J.

progress reports on photomultiplier tube development, 10: 3021(R)

Du Pont de Nemours (E. I.) and Co. Pigments Dept., Wilmington, Del.

progress reports, 10: 2251(R)

progress reports on nitride preparations, 10: 2250(R)

Dust hazards

personnel exposure to, from Th rolling operation, 10: 1188

Dusts

(See also Aerosols; Particles; Powders.)

detection, 10: 10

Dysprosium

(See also Rare earths.)

crystallographic data, 10: 570(R)

ferromagnetic-antiferromagnetic transition in, 10: 3367(R)

## E

Ear Mountain Area (Alaska)

exploration, geology, occurrence of radioactive minerals, 10: 1362(J)

EBR

(See Experimental Breeder Reactor.)

Ecology

of Columbia River, effects of low-level radioactivity, 10: 2595(J)

Eggs

(See also Embryos.)

developing, effects of radiation in Ascaris, 10: 2587(J)

in embryogenesis, parabiosis in, 10: 5(J)

in embryogenesis, parabiosis in, natural and immunological heteroagglutinins in, 10: 7(J)

of Habrobracon, hatchability of, relative effects of exposure to  $\beta$  particles,  $\gamma$  radiation, and x radiation on, 10: 35(J)

radiation effects on grasshopper, 10: 3327(R)

Egnar Quadrangle (Colo.)

exploration, geology, and mineralogy, 10: 158(J)

Elasticity

boundary value problems of plane, closed form solutions, 10: 941

Elastomers

condensation type, preparation and properties of, 10: 738(R)

electrical resistance, tensile strength, elasticity, hardness, and optical properties, radiation effects on, 10: 3127

synthesis of fluorine-containing, 10: 1750(R)

vulcanization, effect of irradiation on, 10: 1946(J)

Eldorado Creek (Alaska)

occurrence of U and radioactive minerals, 10: 1362(J)

Electric arc furnaces

design for heat treatment of Zr-base alloys, 10: 1370(R)

for production of extrusion billets of Mo-Ti alloys, design, 10: 176

Electric conductivity

equipment for measuring, 10: 3479

measurement in fused salts, resistance bridge for, 10: 3023(R)

measurement of electric resistivity of irradiated graphite, 10: 2317  
theory, 10: 2724

Electric connectors

(See Connectors (electric).)

Electric control systems

for detection of thermal expansion in U slugs, design, 10: 1673(P)

Electric currents

measurement, electroscope design for  $10^{-14}$  amp range, 10: 1480(J)

Electric discharge

in air, Hg, He, and A from 50 to 110 kev, 10: 226(J)

artificially produced heavy current impulse, up to 300,000 A, 10: 3831(J)

bibliography on vacuum sparking, 10: 912



**Electric discharge (cont'd)**

- for copper-plated zirconium oxide and copper electrodes, vacuum breakdown, 10: 2458
- electron velocity distribution in plasma, 10: 225(J)
- high frequency, probe methods for investigation in He, Ne, A, and H<sub>2</sub>, 10: 2773(J)
- high-temperature production by, 10: 2770(J)
- of insulators and capacitors for cyclotron, 10: 3620
- light spectra determination for low pressure gases by, 10: 3370(J)
- measurement of characteristics, pulse method for, 10: 224(J)
- photographic effect of counter, 10: 1470(J)
- pinch effect in A and Hg, 10: 2774(J)
- in plasma, magneto-hydrodynamics of, 10: 2775(J)
- in plasma, study of, 10: 2776(J)
- in plasma, theory of the development of channel of spark, 10: 2772(J)
- spectrum of spark, photoelectric investigation of, 10: 913(J)
- theory of destructive sparking in large cavities, 10: 2459

**Electric fields**

(See also Magnetic fields.)

- effect of crystalline, on antiferromagnetic transitions, 10: 320(R)
- electron motion in, 10: 2479
- electron trajectories in  $\beta$  spectrometer, 10: 1467
- glo-ball development for measuring, 10: 928
- ion motion in, associated with calutrons, 10: 2473

**Electric furnaces**

(See Resistance furnaces.)

**Electric insulators**

(See also Dielectrics.)

- development and performance, 10: 1837(R)
- high-voltage, performance, 10: 3619
- resistance and photovoltages of reactor-irradiated, 10: 3035(R)

**Electric power**

(See also Cables.)

- sources of, in European countries, 10: 123(J)

**Electricity**

- production from reactor radiation, 10: 3087(P)

**Electrochemical analysis**

(See also Polarography.)

- method for accurate quantitative determination of organic and inorganic materials, 10: 2016(J)

**Electrochemical corrosion**

- influence of electrolyte thickness on the potential and current distributions, mathematical analysis, 10: 146

**Electrochemistry**

(See also Electrolytic separation processes.)

- fuel cells for chemical-electrical energy conversion, theory and development, 10: 2971(J)

**Electrodes**

(See also specific electrodes e.g. Copper electrodes; Glass electrodes.)

- corrosion of carbon, in fluorine cells, 10: 2325

**Electrodynamics**

(See also Quantum electrodynamics.)

- of particles with zero spin, asymptotic behavior of Green's function in, 10: 1139(J)
- of particles with zero spin, theory of turbulence and asymptotic behavior of Green's functions in, 10: 1138(J)

**Electrolysis**

(See also Corrosion; Electrodes; Electrolytic Separation Processes.)

- migration of ions in ion-exchange resins during, 10: 2256(R)

**Electrolytes**

- poly-, measurement of sedimentation constants of high-polymer, 10: 581
- tissue retention of, effects of total-body irradiation on, in dogs, 10: 26(J)

**Electrolytic cells**

(See also Electrochemical analysis; Electrodes; Electrochemical separation processes.)

- design, materials, and performance for production of F<sub>2</sub>, 10: 2325
- design and performance, 10: 3466
- design for decomposition potential measurements, 10: 2988
- design for electrolysis of CaCl<sub>2</sub>, 10: 2255(R)
- design for recovery of U and V from leach solutions, 10: 2038
- electromotive force for, with single solid or molten chloride electrolyte, 10: 2094(J)
- for U recovery from leach solutions, 10: 2985

**Electrolytic ions**

- Coriolis effect due to relative motion of, 10: 896(J)

**Electrolytic separation processes**

- equipment for fission products separation in non-aqueous solutions, 10: 2988

**Electromagnetic fields**

- interaction with charged particles, 10: 1964(J)

**Electromagnetic pumps**

- bibliography of available unclassified reports, 10: 2699
- for electrically conductive Na and K alloys, design, 10: 3061(P)
- for liquid metals, design, 10: 1660(P)
- mathematical analysis and performance, 10: 783
- performance with NaK, 10: 2511

**Electromagnetic separation**

(See also Calutrons; Mass spectrography; Mass spectrometers.)

- development and principles of, for commercial quantities, 10: 1863
- development of ionic centrifuge, 10: 3624
- ion-source regulators for, design, 10: 1681(P)
- of isotopes at ORNL, 10: 3836
- recycle recovery of Re from, 10: 2335
- scattering in, theory of, 10: 3750
- track assembly of calutrons for space economy and increased separating capacity, 10: 1689(P)

**Electromagnetic separation plant**

(See also Calutrons.)

- chemical procedures for isotope separation, 10: 1293
- uranium salvage from calutron electrodes, 10: 2374

**Electromagnetic waves**

(See also Gamma radiation; Infrared radiation; Radio waves; Ultraviolet radiation; X radiation.)

- interaction with isothermal plasmas, 10: 1437(J)
- production by an electromagnetic vibration exciter, 10: 1331
- propagation in an ionized gas, 10: 1416(J)

**Electron beams**

- depth-dose curves, effects of interposed bone, 10: 2842(J)
- ionization of molecules with, 10: 999(J)
- measurement, electroscope design for 10<sup>-14</sup> amp range, 10: 1480(J)
- scattering by residual gases in strong-focusing synchrotron, 10: 2184(J)
- space charge effects during diffusion, 10: 3019(J)

## Electron capture

transition probabilities for double K-capture and single K-capture with positron emission, 10: 455(J)

## Electron lenses

with small spherical aberration, mathematical analysis, 10: 227(J)

## Electron microscopes

low-voltage power supply for, 10: 1688(P)

metal surfaces observed with, techniques, 10: 3208(J)

modifications and techniques for RCA-type EMU, 10: 3834

## Electron microscopy

gas molecule effects on tungsten monocrystal surface, investigation with, 10: 2017(J)

## Electron multiplier tubes

(See also Photomultiplier tubes.)

fabrication and assembly techniques, 10: 2103

## Electron pairs

annihilation radiation, angular correlation of scattered, 10: 1094(J)

cosmic showers of, analysis of, 10: 211(J)

energy determinations, influence of multiple scattering on, 10: 2778(J)

## Electron showers

analysis, 10: 211(J)

production in cosmic radiation, analysis, 10: 220(J)

## Electron tubes

(See also Electron multiplier tubes.)

design and performance, for calutrons, 10: 3140

matching to resonance cavities, 10: 3852(R)

power delivery and pulse conditions, 10: 233

stabilization of klystron oscillators by gas-absorption spectral line, 10: 930(J)

## Electronic equipment

cathode follower for use with boron-wall tube and its amplifier, design, 10: 3622

circuit for subtractive counting, 10: 1890(J)

circuits for neutron pulse measurements, 10: 3159

delay circuits for analog computation, design, 10: 3139

design, 10: 1411(R)

design, for scintillation spectrometers, 10: 1466

design of voltage measuring, 10: 922

designed by Electronic Division at Harwell, a brief description, 10: 923

pulse height selector, design, 10: 2791(J)

sweep circuit, design, 10: 933(J)

thermocouple short-circuit detector, 10: 3833

time interval-pulse converter, design, 10: 3144(R)

## Electrons

(See also Conversion electrons; Cosmic electrons; Leptons; Positrons.)

anomalous magnetic moments, 10: 3026(R)

asymptotic appearance of Green's function, 10: 2110(J)

behavior of Green's function at small impulses, 10: 1624(J)

biological effects, compared with effect of high-energy x radiation in rats, 10: 1985(J)

bremsstrahlung differential cross sections of Be, Al, and Au for 0.5- and 1.0-Mev, 10: 2780(J)

bremsstrahlung spectrum from 500-Mev, 10: 1439(J)

coincidence spectrometer for, 10: 968(J)

collision cross sections of He atoms and ions for, 10: 1437(J)

Coulomb scattering at small angles, 10: 1440(J)

decomposition of monoalkyl phosphates in aqueous solutions by, 10: 102(J)

## Electrons (cont'd)

decomposition of terphenyl by 1-Mev, 10: 2258(R)

diffraction from ideal monocrystal, 10: 1597(J)

discrete energy losses in metallic foils, 10: 1442(J)

emission, theory and applications of secondary, book, 10: 917(J)

emission by  $K^-$  meson capture, 10: 2138(J)

energy loss measurements in nuclear emulsions, 10: 1443(J)

exchange interaction of valence and inner electrons in crystals, 10: 1433(J)

excitation of anthracene crystals by, 10: 976(J)

formation in calutron acceleration region, and drain, 10: 2460

graphite irradiation with, at liquid He temperatures, 10: 1269(J)

gravitational self-energy, 10: 2958(J)

gyromagnetic ratio measurements by double scattering in a magnetic field, depolarization during, 10: 2779(J)

ionization and excitation produced by secondary, 10: 442(J)

ionization by monoenergetic, in mass spectrometers, 10: 2102(J)

ionization of 2s and 2p states of H by, 10: 2915(J)

knock-on, energy transport by, 10: 1595(J)

linear accelerators for, design, 10: 1079

loss from high-energy photon beams, 10: 2841(J)

loss of, effective cross section for, in N, 10: 3138(J)

from meson ( $\mu$ ) capture processes, 10: 2133(J)

motion in fields of calutron, 10: 2479

nuclear scattering, measurement of absolute differential cross sections for, 10: 425(J)

Pauli exclusion principle for, theory of, 10: 1963(J)

polarization of, during decay of polarized  $\mu$ -meson, 10: 1892(J)

radiation from, moving with constant velocity, 10: 204(J)

reactions with neutrons, possibility of electrical, 10: 2493

scattering, linear energy distribution, 10: 3881

scattering by ideal monocrystals, 10: 1597(J)

scattering by nuclei, effect of nucleon-nucleon correlation on, 10: 1023(J)

scattering from nuclei, 10: 1014

scattering in nuclear emulsions, comparison with positrons, 10: 2192(J)

secondary emission from alkali halide combinations, 10: 1855(J)

self-acceleration, quantum mechanical treatment of, 10: 2963(J)

theory of compensation of, in ion beams, 10: 2777(J)

transmission in Al, brass, Ag, Sn, Pb, and Au, 10: 1441(J)

velocity distribution in plasma, 10: 225(J)

## Electrophoresis

effect on paper-chromatographic analysis, 10: 2629(J)

## Electrostatic generators

(See also Van de Graaff accelerators.)

ion beam energy, stabilization, 10: 1590(J)

## Electrostatics

self-acceleration of charged particles, mathematical treatment of, 10: 1620(J)

## Elementary particles

(See also specific particles, e.g. Mesons; V particles.)

boundary layer behavior of quantum, physical study, 10: 2959(J)

interaction of nucleon-meson fields, 10: 1140(J)

internal structure of spinning, 10: 1633(J)

isotopic spin formalism and classification of heavy fundamental particles, 10: 322(J)

lectures on, by B. Rossi, 10: 324(J)

## Elementary particles (cont'd)

- production of  $x$  mesons and associated  $\Sigma$  particles by nuclear disintegration, 10: 294(J)

## Elements

- crystal structure, table, 10: 909
- electronic structure determination, computation method, 10: 1492(J)
- gamma reactions ( $\gamma, n$ ), 10: 3650(R)
- heat of sublimation at 298°K, 10: 1897
- ionization of K shell by  $\alpha$  particles, 10: 2871(J)
- low temperature thermal expansion, measurement, 10: 3824
- proton reactions ( $p, n$ ), survey, 10: 2152(J)
- screening coefficients for energy levels of heavy, 10: 2873(J)
- stellar origin of the heavy, 10: 1411(R)
- stratification in molten reciprocal systems of Groups I and II, 10: 3170(J)
- tissue distribution of certain low-concentration, 10: 3173(R)

## Elk Ridge Quadrangle (Utah)

- photogeologic map of, 10: 167(J)

## Elongation

- (See Ductility.)

## Emanation

- (See Radon.)

## Embryos

- (See also Fetuses.)

- chick, effects of radiation on, 10: 19
- chick, lipoprotein fractions in, influence of developmental stage on, 10: 1153
- chick, metabolism of formate, glycine, and adenine by, effects of  $\gamma$  irradiation on, tracer study, 10: 1182(J)
- of grasshoppers, radiosensitivity of, effects of metabolic poisons and oxygen, 10: 45(J)

## Emission spectra

- isotopic effects, 10: 1121(J)

## Energy

- (See Atomic energy.)

## Engineering Test Reactor

- fuel elements, 10: 3856

## Entrade Formation (Colo.)

- geology, 10: 1351

## Enzymes

- effects of Be, 10: 2969(R)
- intracellular distribution, 10: 1161(R)
- properties of bacterial luciferase, 10: 3768(J)
- radiation effects on catalase, 10: 1172(J), 1176(J)
- synthesis and factors affecting activity, 10: 3327(R)

## Epinephrine

- (See Adrenaline.)

## Equation of state

- of an electron gas, derivation of an atomic model from, 10: 1438
- of gases, from shock-wave measurements, 10: 1445(J)
- of solids, experimental determination, 10: 993

## Equipment and procedures

- (See also specific devices, e.g. Distillation apparatus; Electronic equipment.)

- corrosion, 10: 3593
- design and performance of gas-lift circulators, 10: 3337

## Equipment and procedures (cont'd)

- design of an electromagnetic rod-position indicator, 10: 3091(P)

## Erbium

- (See also Rare earths.)

- heat capacity from 15 to 320°K, 10: 2032(J)
- magnetic moment, from 20.4°K to 90°K, 10: 2942(J)
- spectrum analysis by echelle spectrograms, 10: 3309(R)

## Erbium iodides

- preparation, 10: 62

Erbium isotopes  $\text{Er}^{171}$ 

- beta emission, 10: 3656

## Erie Tuff (Nev.)

- stratigraphy and mineralogy, 10: 1358

## Erythrocytes

- (See also Hemoglobin.)

- cholinesterase titers, 10: 2634(J)
- ion transport across cell membrane in, 10: 1(R)
- potassium transport in, effects of sickling on, 10: 51(J)
- radiosensitivity effects of, injected in mice, 10: 3768(J)
- sodium and cesium transport in, effects of sickling on, 10: 52(J)

## Erythropoiesis

- radiosensitivity, effects of mercaptoethylamine and liver shielding in rats, tracer study, 10: 3772

## Escherichia coli

- enzymatic factors, 10: 3327(R)
- nucleic acid metabolism, effects of bacteriophage infection, 10: 3768(J)
- phosphorus metabolism, effects of radiation and certain organic chemical compounds, 10: 3252
- radiation effects on desoxyribonucleic acid in, 10: 3770
- radiosensitivity and effects of freezing, 10: 3767
- radiosensitivity of, during the growth cycle, 10: 526(J)
- radiosensitivity of, effects of metabolites on, 10: 41
- sensitivity to long-ultraviolet and short-visible radiations, 10: 3768(J)

## Ethane, chloro-

- chemical reaction with  $\text{GaCl}_3$ , 10: 2012(J)

## Ethane, dimethoxy-methyl borate systems

- phase studies, 10: 60

## Ethane-hydrochloric acid systems

- phase studies, 10: 1334(J)

## Ethanethiol, 2-amino-

- protective action from x-radiation effects on rats, 10: 1167
- protective effects against radiation injuries in fetal mice when administered to pregnant mother, 10: 1998(J)
- protective effects of, against radiation injuries, in mice, 10: 540(J)

## Ethanol

- radiolysis, effects of energy input on, 10: 3272

## Ether, bis(2-butoxyethyl)

- solvent properties for uranyl nitrate in aqueous solutions, 10: 3543

## Ether, bis(2-chloroethyl)

- solvent properties for  $\text{Te}^{4+}$ ,  $\text{In}^{3+}$ , and mineral acids, 10: 3329(R)

## Etherates

- (See Aluminum chloride etherates.)

## Ethyl acetate

- solvent properties for  $\text{UO}_2(\text{NO}_3)_2$ , 10: 3528(R)



## Ethyl ether

- ethyl peroxide removal from, by extraction with certain aqueous solutions, 10: 3492
- thermodynamic properties in bubble chambers, 10: 960(J)

## Ethyl peroxide

- removal from diethyl ether by solvent extraction, 10: 3492

## Ethylamine, 2, 2'-dithio bis-

- effects on radiation injuries in silkworms, 10: 1999(J)
- protective effects of, against radiation injuries in mice, 10: 540(J)
- radioinduced degradation, 10: 2028(J)

## Ethylene

- gamma-induced polymerization, 10: 654
- ultraviolet absorption spectra of deuterium-labeled, 10: 1124(J)

## Ethylene, 1-chloro-1-fluoro-

- infrared spectra and thermodynamic functions, 10: 1266(J)

## Ethylene, chlorotrifluoro- polymers

- corrosion in Hanford process solutions, 10: 3595

## Ethylene polymer coatings

- applications to structural materials, 10: 1658(P)

## Ethylene polymers

- electric and elastic properties, effects of electron irradiation on, 10: 2920(J)
- inelastic scattering of neutrons, time-of-flight measurements, 10: 437(J)
- low temperature thermal expansion, measurement, 10: 3824
- paramagnetic resonance in, x-irradiation effects on, 10: 2217(J)
- properties of fluorothene, 10: 2404

## Ethylene, tetrafluoro- polymers

- corrosion in Hanford process solutions, 10: 3595
- nuclear magnetic resonance, 10: 2220(J)
- paramagnetic resonance in, x-irradiation effects on, 10: 2217(J)

## Ethylene, trichloro-

- infrared spectra of D-labeled, 10: 1749(J)
- radiolysis by helium ions, 10: 3104
- spontaneous decomposition during Al cleaning, procedures for prevention, 10: 2614

## Ethylene, trichlorofluoro-

- infrared and Raman spectra, 10: 1264(J)

## Ethylenediamine

- solutions with  $Hg^{2+}$  salts, conductances and viscosities, 10: 1222(J)

## Ethylenediaminetetraacetic acid

- (See Acetic acid (ethylenediamine) tetra-.)

## Ethylenimine

- rotational spectrum of imine-deuterated, 10: 1127(J)

## Eureka Gulch Area (Colo.)

- geology, mineralogy, and U distribution, 10: 1363(J)

## Europe

- fuel and power potentials in, a summary, 10: 123(J)

## Europium

- (See also Rare earths.)

- metabolism and excretion rates of, in rats, 10: 1694

## Europium isotopes

- electromagnetic separation, 10: 3026(R)
- energy levels, 10: 1903(R)
- proton excitation, 10: 1611(J)

Europium isotopes  $Eu^{152}$ 

- gamma spectra, 10: 469(J)

Europium isotopes  $Eu^{153}$ 

- weak  $\gamma$  emissions, 10: 1411(R)

Europium isotopes  $Eu^{154}$ 

- gamma spectra, 10: 469(J)

## Europium oxides

- phase studies, 10: 659(J)

## Evanston Area (Wyo.)

- uranium occurrence, 10: 151

## Evaporators

- (See also Distillation apparatus.)

- cost of, for cooling  $H_3PO_4$ , 10: 2749

## Experimental Breeder Reactor

- neutron flux distribution, 10: 3650(R)

## Exploration

- statistical methods of U exploration, 10: 1356

## Exponential piles

- buckling, multiplication factor, and reactivity measurements in graphite-U lattices, 10: 1922
- buckling and criticality measurements, correlation with theory, 10: 1564
- buckling of, effect of epithermal neutrons on, 10: 3315(R)
- buckling of, effect on excess absorption in moderator, 10: 3315(R)
- design of Fast Exponential Experiment, 10: 3384
- neutron diffusion length, 10: 1033
- parameter measurements on natural U- $H_2O$ , 10: 3392
- reactivity measurements on slightly enriched U- $H_2O$ , 10: 3391

## Extensometers

- (See also Strain gages.)

- design of remotely operated, 10: 1860(J)
- temperature and radiation effects on, 10: 781

## Extraction apparatus

- (See also Mixer-settlers; Packed columns; Spray columns.)

- continuous liquid, remote control for, 10: 1817
- countercurrent liquid-liquid extractor, design and performance, 10: 2989
- design and performance of a miniature pump-mix mixer settlers, 10: 117
- design for U recovery from phosphoric acid, 10: 678(R)
- design of a micro-mixer-settler for continuous counter-current solvent extraction, 10: 1271
- development of continuous countercurrent ion exchange contactor, 10: 2326
- development of Higgins continuous ion-exchange contactor, 10: 1292
- efficiency of Murphree plate for liquid-film-controlling gas-liquid contacting, formula, 10: 1733(J)
- performance of a centrifugal extractor, 10: 568(R)
- performance of perforated plate, effect of wetting properties, 10: 78(J)

## Extrusion

- equipment for, of Al alloys, 10: 828(R)

## Eyes

- cataracts induced by injected iodoacetic acid in rabbits, 10: 1717
- effects of gamma rays on biological activity of retina, 10: 527(J)
- effects of irradiation on organic phosphate compounds of lens, in rabbits, 10: 40(J)
- effects of x radiation on cornea nerve elements, 10: 24(J)
- radioinduced cataracts in rabbit, 10: 2580(J)
- radiosensitivity of, of laboratory animals, 10: 516(R)

## F

## F coefficients

- tables, for angular correlations between successive nuclear radiations, 10: 1008

## Fall-out

(See also Fission products.)

- air activity studies at Corryton, Tenn., and Gainesville, Fla., from 1951 Eniwetok tests, 10: 2246
- measuring methods of particles in, cascade filtration theory, 10: 1846
- monitoring, 10: 2592, 2610
- monitoring, by effects on sheep, 10: 2577
- monitoring data collected at Washington, D. C., from 1951 to May 1955, 10: 1704
- monitoring in Massachusetts in 1953, 10: 2593
- pathological effects from thermonuclear explosions, 10: 16

## Fall River Formation (S. Dak.)

- mineralogy and U occurrence, 10: 1789(J)

## Fast fission

- measurement in  $U^{235}$  and  $U^{238}$ , 10: 3886

## Fast neutron cross sections

- measurement in Pb, Al<sup>27</sup>, and Au<sup>197</sup>, 10: 1508(R)

## Fast neutrons

- attenuation in spherical homogeneous mixture of  $U^{235}$  and  $H_2O$ , Monte Carlo calculation, 10: 2858
- coincidence spectrometer for, utilizing stilbene scintillators, 10: 2119(J)
- decomposition of terphenyl by, 10: 2258(R)
- detection, time of flight spectrometer for, 10: 962(J)
- detection and measurement, 10: 3327(R)
- detection and measurement, sensitivity of CP Meter ionization chamber to, 10: 2481
- detection of, fission chamber design for, 10: 975(J)
- detection with TI-activated KI dispersed in polystyrene, 10: 263(J)
- diffusion of, from pulsed source, 10: 1005(J)
- dosage determinations, 10: 3030
- dosimeter for, design of, 10: 950
- dosimeter operation in high  $\gamma$  fields, 10: 256(J)
- effects on electrical properties of GaSb, 10: 2923(J)
- flux measurements in recoil counters, 50 to 2000 kev, 10: 250
- monitoring, by damage to graphite in MTR, 10: 2892
- production of  $H_2O_2$  in aerated water by exposure to, 10: 97(J)
- scattering, Be resonance, 10: 3649(R)
- thermal neutron flux distribution from line source of, 10: 2861(J)

## Fast reactors

(See also Experimental Breeder Reactor; Los Alamos Fast Reactor.)

- calculational methods for neutron diffusion in dilute and intermediate, 10: 2507
- criticality studies of, design of Fast Exponential Experiment for, 10: 3384
- mathematical analysis of differential equations arising in safety study, 10: 1560
- physics, status in U.K. and U.S., 10: 1029

## Fatigue

- determination in metals by x-ray scattering, 10: 1826(J)
- failure in alloys with annealing twins, processes of, 10: 1824(J)

## Fatty acids

- chemical determination of, in animal tissues, 10: 13
- concentration of, in lymph, effects of heparin on, 10: 3
- hydrolysis and chemical determination of, from animal tissues, 10: 12

## Fatty acids (cont'd)

- irradiated, paramagnetic resonance, 10: 1309(J)
- metabolism in rats, 10: 3184
- radioinduced oxidation, 10: 515(R)

## Feces

- radiometric analysis of, for  $\alpha$  emitters, 10: 606

## Feldspars

- ratio of  $A^{40}$  to  $K^{40}$  in, 10: 937(J)

## Fermentation

(See also Organic syntheses.)

- by lactic acid bacteria, tracer study, 10: 2673(J)

## Fermions

(See also Electrons; Elementary particles; Mesons; Neutrinos; Neutrons; Protons.)

- boson field interaction, 10: 1140(J)
- energy calculations, 10: 487
- lectures on, by B. Rossi, 10: 324(J)

## Fertilizers

- analysis for fluorine, 10: 1243(J)
- production from Florida leached zone material, 10: 2260(R), 2261(R), 2262(R), 2263(R), 2264(R), 2265(R), 2266(R), 3418

## Fetuses

(See also Embryos.)

- radiation protection afforded by cysteinamine administered to pregnant mother, in mice, 10: 1998(J)

## Field theory

(See also Quantum electrodynamics.)

- elimination of divergences in scattering matrix, 10: 1628(J)
- intermediate coupling theory for pseudo-scalar meson field and a nucleon, 10: 1917(J)
- many-body problems for strongly interacting particles, approximation method, 10: 493(J)
- meson-nucleon coupling assuming extended isotopic spin invariance, 10: 496(J)
- nucleon proper fields, analysis and exact numerical solution, 10: 1918(J)
- quantum, with causal operators and Schwinger's function, 10: 945(J)
- structure of Green's functions in, 10: 497(J)

## Films

(See also specific films, e.g. Corrosion films; Indium films.)

- magnetic properties of H-annealed Fe - Ni, 10: 2751(R)
- magnetic properties of Fe - Ni, 10: 2788(R)

## Filter materials

- efficiency for air cleaning and sampling, 10: 3779
- properties and effectiveness for air sampling, 10: 1778(R)

## Filter papers

- airborne  $\alpha$  contamination removed by, efficiency, 10: 3617

## Filters

- anaerobic, design, 10: 3124
- cascade theory, study of suspended particles, 10: 1846
- development of high-efficiency for air sampling, 10: 1778(R)
- trickling, removal of fission products from laundry wastes by, 10: 754

## Finned tubes

- heat transfer and pressure losses for gas flow through, 10: 131(R)

## Fires

- where radioactivity is a hazard, control, 10: 535

## First Broad River Area (N.C.)

- exploration, geology, mineralogy, and monazite reserves, 10: 805

## Fish

- effects of radioactivity from reactor effluent on, 10: 513(R)
- strontium metabolism in, tracer study, 10: 1718(R)
- thyroid distribution and function in, tracer study, 10: 1161(R)

## Fission

(See also Capture-to-fission ratios; Chain reactions; Fast fission; Multiplication factor; Nuclear reactions; Photo fission; Spontaneous fission.)

- asymmetry, relation to  $Z^2/A$  of the target nucleus, 10: 1526(J)
- chain reactions, review, 10: 3247(J)
- gamma emission from, of  $U^{235}$ , 10: 3764
- half lives, systematics of, 10: 1527(J)
- heat production from, in slab of variable density, 10: 3661
- of heavy nuclei by relativistic particles, asymmetry in range of fragments, 10: 391(J)
- from meson ( $\pi^-$ ) capture in U, Bi, and W, 10: 275(J)
- theory of neutron yield fluctuations, 10: 3033

## Fission chambers

- design, 10: 975(J)
- design and performance for reactor instrumentation, 10: 2467
- design and properties, 10: 3649(R)
- design for fast-fission measurements, 10: 3886

## Fission-counting analysis

- for uranium isotopes  $U^{235}$ , improvements in precision of, 10: 3763

## Fission cross sections

(See Neutron fission cross sections.)

## Fission products

(See also Fall-out; Photofission products; Radioisotopes; Spallation products;

- activities and relative yields in neutron-irradiated U, 10: 1762(J)
- adsorption on stainless steel, 10: 3488(R)
- adsorption on various types of soil, 10: 42(R)
- analysis for  $Th^{230}$ ,  $Pa^{233}$ ,  $U^{235}$ ,  $U^{237}$ , Cm, Pu, Np, and Am, 10: 1230
- angular distribution of, from U bombarded with 660-Mev protons, 10: 499(J)
- beta activity, measured by x-ray and photographic films, 10: 1479(J)
- capture cross sections to  $U^{235}$  fission cross section, ratio of, 10: 1058
- charge and electron capture cross section, determination in gases, 10: 1542(J)
- control, in power production reactor installations, 10: 1551
- decay activity for cyclic operation of a reactor, 10: 2512(R)
- detection system for ruptured fuel elements, 10: 2513
- determination, in Redox and Metal Recovery plant streams by  $\beta$ - $\gamma$  scintillation spectrometers, 10: 3637
- determination in urine, by ion exchange, 10: 3440
- determination of Cs, Sr, Y, Ce, Ru, Zr, and Nb in soils, 10: 2631(J)
- from deuteron bombardment of U, 10: 2239(J)
- diffusion and ion exchange reactions with soils and clays, effects on waste disposal, 10: 1327(R)
- disposal, from fuel element wastes, 10: 1330(J)
- distribution curves, from uranium  $U^{235}$  bombardment with d, p, and  $He^3$ , 10: 2240(J)
- distribution in PWR type reactor systems, 10: 1562
- electrolytic separation in non-aqueous solutions, 10: 2988
- energy measurement, discrepancies in, 10: 3367(R)
- evaporation from U reactor fuel, 10: 3797
- formation of low cross section, in the MTR, 10: 2889

## Fission products (cont'd)

- gamma emission from, of  $U^{235}$ , 10: 3764
- gamma-ray spectrum of, from slow neutron irradiation of  $U^{235}$ , 10: 2197(J)
- growth and accumulation of, in plants grown on soil contaminated with, 10: 50
- half lives, thermal neutron capture cross section, and gamma and beta energies, 10: 3890
- half lives of, at subsequent times after irradiation at various periods of time, 10: 43(R)
- heat generation in accident to heavy water boiling reactor, hazards from, 10: 2167
- ion exchange removal from boric acid solutions with montmorillonite clay, 10: 2327
- liquid metal extraction, 10: 62
- liquid metal extraction from U, 10: 569(R), 570(R)
- low cross section, effects on reactor criticality, 10: 2889
- of mass number 108 to 116, decay curves, 10: 3329(R)
- metabolism in domestic animals, 10: 1169(R)
- metabolism in marine organisms, 10: 1718(R)
- metabolism in plants and animals, 10: 2242(R), 3409(R)
- monitoring in MTR coolant streams, 10: 3147
- neutron absorption cross sections, activity, and formation in homogeneous reactors, 10: 1547
- neutron capture cross sections, 10: 3890
- photoneutron yield from  $U^{235}$ , in Be, 10: 2859(J)
- plant metabolism of  $Sr^{88}$  and  $Ru^{103}$ , 10: 2970
- poisoning effects, calculation with distribution functions, 10: 3726
- poisoning effects on the ISHR at 250 and 100°C, 10: 3702
- poisoning of Chalk River reactors by, 10: 2885
- poisoning of thermal reactors by, 10: 1564(J)
- production separations for radioisotope program, isolation, and stripping, 10: 3025
- properties in mass region 103 to 131, 10: 1903(R)
- proportional counter detection, 10: 248
- radiochemical analysis, 10: 2626
- radiochemical determination and separation, 10: 3267
- radiometric determination following leaching from soil, 10: 1240
- reactions in sodium-cooled reactors, 10: 3857
- reactor criticality effects in MTR, 10: 1052
- removal from waste solutions, methods, 10: 1773(J)
- removal of, from laundry wastes by trickling filters, 10: 754
- separation from  $Al(NO_3)_3$  solutions by co-precipitation, 10: 1328
- separation from irradiated U by adsorption on silica gels, 10: 1654(P)
- separation from liquid U by  $UF_4$  volatilization, 10: 3348
- separation from Pu and U by ion exchange, 10: 1319
- separation of high-activity  $Xe^{135}$  samples from, 10: 2472
- solvent extraction from reactor-irradiated U, 10: 2666(J)
- uptake and tissue distribution in laboratory animals and plants, factors affecting, 10: 513(R)

## Fissionable material

- critical dimensions of  $H_2O$ -tamped spheres and slabs, and application to  $UF_6$ , 10: 3749
- criticality studies of sphere surrounded by U shell, 10: 3757
- neutron diffusion, 10: 2491

## Flaming Gorge Quadrangle (Utah)

- geologic map of, 10: 812(J)

## Flash burns

(See Burns.)



## Flavonols

aldohexoside synthesis, 10: 3058(P)

## Florida leached zone material

acid and caustic leaching, 10: 713(R)

acid leaching for U recovery, 10: 1294

acid leaching of residue from caustic teaching of, for U and V recovery, 10: 714(R)

analysis, mineralogy, and processing, 10: 1297

analysis for  $U_3O_8$ , 10: 1720(R)

beneficiation, flotation, and uranium recovery, 10: 2262(R)

beneficiation, petrology, and uranium recovery, 10: 2261(R)

beneficiation, phosphate recovery and uranium recovery, 10: 2260(R)

benefication by drying, grinding, air classification, and gravity concentration, 10: 1720(R)

caustic and organic leaching for U recovery, 10: 695(R)

caustic leaching of, for U recovery, 10: 745(R)

digestion with  $H_2SO_4$ , 10: 1296

extraction of  $P_2O_5$  and U from, 10: 2265(R)

extraction of  $P_2O_5$  and U from, by ammonia, KOH, and  $HNO_3$ , 10: 2263(R)

leaching of, with  $NH_4HSO_4$ , 10: 65

processing for recovery of Al, P and U, 10: 2259(R)

recovery of Al and U from, following leaching with acids, caustics, carbonates, and organic phosphates, 10: 688(R)

recovery of U and V from, 10: 699(R)

recovery of U from, 10: 693(R), 708(R)

recovery of U from, by caustic leaching, 10: 709(R), 710(R), 711(R)

recovery of U from acid leaches of, 10: 692(R)

roasting with  $H_2SO_4$ , effects of, 10: 1295

uranium, Al, and P recovery from, by precipitation, 10: 712(R)

uranium and vanadium recovery by solvent extraction, 10: 697(R)

uranium and V recovery from, 10: 696(R), 700(R)

uranium recovery, 10: 698(R)

uranium recovery and beneficiation, 10: 3418

uranium recovery and fertilizer production from, 10: 2266(R)

uranium recovery by solvent extraction, 10: 701(R), 3113

uranium recovery from, 10: 2263(R)

uranium recovery from, and fertilizer production from, 10: 2264(R)

uranium recovery from, by solvent extraction, 10: 704(R), 707(R)

uranium recovery from acid leach solutions of, 10: 690(R)

## Flotation

air bubble motion, 10: 1781(R)

solid-liquid interface replacement rate, 10: 1781(R), 3186(R)

## Flowmeters

(See Fluid flow; Gas flow; Liquid flow.)

design for remote measurement of liquid flow, 10: 2322

design of electrical, for fluid flow, 10: 2790

electromagnetic, bibliographies, 10: 2699

performance, 10: 3626

sensitivity, dependence on velocity profile in electromagnetic, 10: 1451(J)

## Fluid flow

(See also specific types of flow, e.g. Compressible flow; Convection.)

external friction at low pressure, 10: 3371(J)

free convection, theory and experiments, 10: 129

measurement, effects of velocity profile on the sensitivity of electromagnetic flowmeters, 10: 1451(J)

## Fluid flow (cont'd)

measurement by electric flowmeters, 10: 2790

mechanics equations and transport phenomena, 10: 1733(J)

non-linear conical, theory, 10: 775(J)

in single-phase natural-circulation  $H_2O$  loop systems, analysis, 10: 3800

transition from laminar to turbulent, in boundary layer, 10: 140(J)

water, in natural circulation boilers, 10: 765(J)

## Fluid flow (laminar)

effect of variable properties on, 10: 132

structure of, 10: 771(J)

through porous plates, 10: 124

## Fluid flow (turbulent)

boundary layer calculation in presence of heat transfer, 10: 2694(J)

heat transfer, 10: 763

mathematical analysis, 10: 133(J)

velocity profiles and friction factors for, 10: 3353

## Fluid fuel reactors

(See also Homogeneous reactors; Liquid Metal Fuel Reactor.)

breeding, criticality studies, and neutron flux distribution, Univac data evaluation, 10: 3146

design, breeding, and delayed neutron losses, 10: 3679

temperature dependent kinetics, 10: 1030

transients and steady state conditions, 10: 2518(R)

## Fluid reactor fuels

(See Reactor slurries; Reactor solutions.)

## Fluids

(See also Body fluids; Hydraulic fluids.)

properties of heat transfer, for use in aircraft equipment cooling systems, 10: 764

## Fluophosphoric acid

crystal structure of  $HPF_6-6H_2O$ , 10: 90(J)

## Fluoplatinates

of magnesium and alkaline earths, preparation and physical properties, 10: 3271

## Fluorescence

(See also Luminescence; Phosphorescence; Scintillation.)

in liquid phosphors, 10: 251(R)

measurement, performance of fluorometer, 10: 3460

yields of  $Cu^{65}$ ,  $In^{115}$ , and A, 10: 1523(J)

## Fluoride complexes

ionic refractivities, 10: 2647(J)

## Fluoride volatility processes

separation of Pu and fission products from liquid U by  $UF_4$  volatilization, 10: 3348

## Fluorides

(See also specific fluorides, e.g. Rare earth fluorides; Uranyl fluorides.)

analysis for Al, 10: 1737

colorimetric determination, 10: 2274

direct potentiometric titration, 10: 3269(J)

pyrohydrolytic determination in heavy metal ammonium fluorides, 10: 3780

volumetric determination of trace amounts, 10: 1245(J)

## Fluorine

activation determination, 10: 2632(J)

analysis, 10: 2312

chemistry and industrial applications, 10: 1257(J)

## Fluorine (cont'd)

- colorimetric determination, 10: 2274
- colorimetric determination in phosphates and fertilizers, 10: 1243(J)
- colorimetric determination in U and water, 10: 3175
- corrosive effects, 10: 2309
- determination in chlorine, 10: 2279
- determination in polyhalo organic compounds, 10: 2269
- disposal of waste, in laboratories, 10: 2643
- exchange reactions between HF and fluoromethanes, 10: 2646(J)
- neutron scattering by, 10: 3144(R)
- production, by electrolysis of HF, 10: 2313
- production, control of HF concentration of electrolyte, 10: 3466
- production, electrolytic cells for, 10: 2325
- production, recovery of hydrofluoric acid and hydrogen, 10: 3468
- production by electrolysis, 10: 2309
- production of compressed, 10: 2312
- proton resonances ( $p, \gamma$ ) in, 10: 1909(J)
- purification, 10: 3467
- pyrohydrolytic determination in  $UO_2F_2$  and  $UF_4$ , 10: 615
- thermodynamic properties from 25 to 2000°K, 10: 1721

## Fluorine compounds

- preparation, properties, and applications, 10: 1257(J)
- toxicity of  $ClF_3$  in rats, 10: 1201(J)

Fluorine isotopes  $F^{17}$ 

- energy of first excited state, measurement, 10: 395(J)

Fluorine isotopes  $F^{18}$ 

- chemical state, formed by neutron irradiation of fluorobenzene, 10: 637(J)
- production, 10: 1260(J)

Fluorine isotopes  $F^{19}$ 

- deuteron reactions (d,n), investigation using fast neutron spectrometer, 10: 1571(J)
- excited state at 197 kev, mean life, 10: 2928(J)
- magnetic moment of excited state of, 10: 1540(J)
- neutron reactions ( $n, \alpha$ ) and ( $n, p$ ), excitation functions and absolute cross sections, 10: 396(J)
- neutron total cross sections, 0.5 to 5 Mev, 10: 320(R)
- nuclear magnetic moments, 10: 2879(J)
- proton reaction ( $p, n$ ), counter ratio, neutron yield, neutron thresholds, and cross section, 10: 398(J)
- proton reactions ( $p, \alpha$ ), angular distribution of  $\alpha$  particles from, 10: 2910(J)

## Fluorocarbons

- colorimetric determination of  $C_8F_{18}$  with 8-hydroxyquinoline, 10: 2275
- crystal structure and low-temperature molecular properties, 10: 1216
- preparation of crude  $C_{21}F_{44}$ , 10: 2311
- toxicity of  $C_7H_{14}$  and  $C_8F_{18}$ , 10: 3414

## Fluoroesters

- lubricating and wear properties for high-temperature uses, 10: 2644

## Fluorohalocarbon polymers

- preparation of, 10: 739(R)

## Fluorohalocarbons

- preparation of  $C_7ClF_{18}$ , 10: 2314

## Fluorohalohydrocarbons

- preparation and polymerization of, 10: 739(R)

## Fluorolube oil

- production procedure, 10: 3465

## Fluoroorganic compounds

- chemical reactions of fluorine-containing olefins, 10: 2020(R)
- preparation, 10: 2314
- preparation and properties for use in elastomers, 10: 738(R)
- properties and military applications, 10: 2645
- synthesis and properties, 10: 1750(R)

## Fluoroorganic polymers

- preparation of fluoroacrylate polymers, 10: 1750(R)
- synthesis, 10: 2020(R)

## Fluorophotometers

- design, for U analysis, 10: 1837(R)

## Fluorothene

- (See Ethylene, chlorotrifluoro- polymers.)

## Folios

- (See also specific foils, e.g. Copper foils; Metallic foils.)
- multiple Coulomb scattering in thin, 10: 2917(J)
- neutron self-shielding of plane absorbing, 10: 3850

## Folic acid

- radiosensitivity effects in rats, 10: 3767

## Food

- (See also Diet.)

- control of insect infestation in stored flour, grains, and cereal products by  $\gamma$  irradiation, 10: 14
- effects of radiation on and sterilization of, by exposure to radiation, bibliography, 10: 17, 18
- radioinduced sterilization of, and effects of irradiation on, 10: 515(R)
- radiopasteurization of, theory, cost factors, and design of processing plant, 10: 1162
- radiosterilization of, a review, 10: 29(J)
- radiosterilization of meat, distribution problems associated with, 10: 512
- radiosterilization of meat, facility design, 10: 2579
- sterilization of meat by  $\gamma$  irradiation, 10: 1170

## Foot Mineral Co. Philadelphia

- progress reports on Zr metal fines recovery, 10: 1215(R)

## Forced convection

- (See Convection (forced).)

## Formates

- metabolism by chick embryos, effects of  $\gamma$  irradiation, tracer study, 10: 1182(J)

## Formic acid

- radiation chemistry, 10: 1696(R), 3165(R)
- reaction with  $Fe^{3+}$  in aqueous solution,  $\gamma$ -induced, 10: 1273(J)
- titrimetric determination in UNH, 10: 2285

## Fourier analysis

- (See Harmonic analysis.)

## Foutz No. 1 Mine (N. Mex.)

- mineralogy and U occurrence, 10: 2063

Francium isotopes  $Fr^{212}$ 

- alpha decay scheme, 10: 462(J)
- alpha emission, 10: 461(J)

## Franklin Inst. Labs. for Research and Development, Philadelphia

- progress reports, 10: 3199(R)
- progress reports on development of water-lubricated thrust bearings, 10: 3188(R)
- progress reports on diffusion in metals, 10: 1386(R)

## Free convection

(See Convection (free).)

## Freons

(See also Fluorohalocarbons; Fluorohalohydrocarbons.)

preparation, properties, applications, and nomenclature, 10: 1257(J)

## Friction

(See also Fluid flow; Gas flow; Liquid flow; Surface friction.)

mathematical analysis for air flow through hexagonal bundles of tubes, 10: 3004

theory of, for sliding contact of metals in liquid Na, 10: 2092

## Fructose

metabolism in mice, tracer study, 10: 3104

## Fruit flies

(See Drosophila.)

## Fuel elements

(See Reactor fuel elements.)

## Fungi

oxygen consumption following irradiation, 10: 1991(J)

## Fungicides

labeled with  $S^{35}$ , preparation, 10: 1202

mode of action, tracer study, 10: 1202

## Furnaces

(See also specific types of furnaces, e.g. Electric arc furnaces; Kilns.)

design and operation of, for spectrographic analysis of toxic or radioactive materials, 10: 486(J)

design and operation of an induction and resistance, for high vacuum-high temperature applications, 10: 1833(J)

graphite, design and operation for temperatures up to 3000°K, 10: 118

## Fused salts

electric conductivity measurement, resistance bridge for, 10: 3023(R)

electrolysis in deposition of Be, Th, and Zr, 10: 1367

equilibrium constants by thermographic method, 10: 3172(J)

mixtures, relationship between concentration and activity, 10: 3830

specific heat, measurements and theory, 10: 2054

## G

## Gadolinium

(See also Rare earths.)

gamma capture in, internal conversion, 10: 3657

## Gadolinium isotopes

energy levels, 10: 1903(R)

proton excitation, 10: 1611(J)

## Galenas

(See also Lead sulfides.)

isotopic content and geological age of Pb in, 10: 2088(J)

## Gall bladder

excretion of injected  $Co^{60}$  by, in dogs, 10: 1205(J)

## Galling

thermal aspects, theory, 10: 1840

## Gallium

separation from Be, Ge, and In by paper chromatography, 10: 1246(J)

separation of Zn and Ni from, 10: 570(R)

## Gallium-antimony alloys

conductivity and resistivity, effect of neutron irradiation on, 10: 3035(R)

## Gallium-antimony alloys (cont'd)

electrical properties, effects of fast-neutron irradiation on, 10: 2923(J)

## Gallium chlorides

chemical reactions with ethyl, isopropyl, n-propyl, and t-butyl chlorides, 10: 2012(J)

## Gallium halides

basic dissolution, kinetics, 10: 571(R)

## Gallium isotopes

separation procedures, 10: 2470

Gallium isotopes  $Ga^{67}$ 

decay scheme, 10: 1113(J)

Gallium isotopes  $Ga^{72}$ 

gamma emission, 10: 3650(R)

## Gamma-absorption analysis

photon sources including  $Am^{241}$ , 10: 3105

## Gamma radiation

(See also Photons; X radiation.)

absorption, methods of calculating and application to reactor shielding, 10: 2187

absorption in tissues, 10: 2839(J)

air scattering of  $Co^{60}$ , comparison of theory and experiment, 10: 3880

angular distribution, following surface scattering of nucleons, 10: 1572(J)

angular distribution, from  $Be^9(\alpha, n\gamma)C^{12}$  reaction, 10: 2902(J)

angular distribution, from Coulomb excitation of nuclei, 10: 2147

angular distribution in Coulomb excitation, 10: 364(J)

angular distribution of multiply scattered, 10: 1942(J)

attenuation by shielding for boiling reactors, 10: 2534

attenuation by water, measurements in MTR Mockup, 10: 2560

attenuation of BSF, in Fe-H<sub>2</sub>O mixtures, 10: 2508

attenuation nomogram, 10: 2911(J)

beams, determination of center of axially symmetric, by segmented ion chambers, 10: 971(J)

from cesium<sup>137</sup>, dosage determinations, 10: 2002(J)

chlorination of aromatic hydrocarbons induced by, 10: 1280(J)

from cobalt<sup>60</sup>, dosage determinations, 10: 2003(J), 2004(J)from a  $Co^{60}$  source, measurement of, 10: 1101

in the control of insect infestations in stored flour, grains, and cereal products, 10: 14

conversion coefficients from 100 to 500 kev, 10: 3851(R)

conversion to heat, in Al irradiated in MTR, 10: 2918

conversion to heat in Al and Pb, in MTR, 10: 1043

from Coulomb excitation of  $Pt^{186}$  and  $Cd^{114}$ , angular distribution, 10: 2145(J)

currents produced in solid dielectric RG 8/U cables by, 10: 3155

decomposition of monoalkyl phosphates in aqueous solutions by, 10: 102(J)

decomposition of terphenyl by, 10: 2258(R)

detection, development of glass detectors, 10: 3845

detection and measurement, calibration of equipment, 10: 3034(R)

detection and measurement, design of a portable reader for DT-60 dosimeters, 10: 2815

detection and measurement, design of rate meter for, 10: 249

detection and measurement, performance of scintillation counter with photographic pulse height analyzer, 10: 2814

detection and measurement, performance of silver-activated phosphate glass for, 10: 955(R)

detection and measurement, performance of survey meter, 10: 3639

detection and measurement, portable scintillation counter for, 10: 3080(P)



## Gamma radiation (cont'd)

- detection and measurement, using an uranyl oxalate actinometer, 10: 750(J)
- detection and measurement in the presence of  $\beta$  particles, coincidence technique employing scintillation counter equipment, 10: 1473(J)
- detection and measurement of, from MTR Mockup, 10: 3698
- detection and measurement of, from the human body, performance of a scintillation counter for, 10: 946
- from deuteron bombardment of  $\text{Al}^{27}$  and  $\text{P}^{31}$ , 10: 1576(J)
- from deuteron bombardment of  $\text{B}^{10}$ , 10: 1932(J)
- directional correlation of  $\text{Ni}^{60}$   $\gamma$ - $\gamma$  cascade, 10: 1110(J)
- dosage determinations, 10: 3030
- dosage determinations in the Brookhaven Reactor thermal column, 10: 948
- dosage in heterogeneous reactors, 10: 2899(J)
- dosimetry, performance of ionization chambers, 10: 2113(J)
- dosimetry, performance of photographic film detectors, 10: 2810
- dosimetry of high-energy, calibration of anthracene dosimeters, 10: 1464
- effect on ultraviolet absorption carbohydrates, 10: 1171(J)
- effects of exposure, in rats, 10: 22
- effects of exposure to, on food and water consumption in rats, 10: 21
- effects of exposure to, on hatchability of eggs of *Habrobracon*, 10: 35(J)
- effects of exposure to, on pneumococcus desoxyribonucleic acid, 10: 30(J)
- effects on biological activity of retina, 10: 527(J)
- effects on corrosion of stainless steel, 10: 2252(R)
- effects on solutions of sodium desoxyribonucleate, 10: 1278(J)
- elastic scattering, in Pb, Sn, Cu, and Hg, cross sections for, 10: 2916(J)
- elastic scattering by protons, cross-section measurements, 10: 438(J)
- energy measurement by precision curved crystal  $\gamma$  spectrometer, 10: 2837(J)
- excitation of Cherenkov luminescence in liquids, 10: 1945(J)
- from hectocurie  $\text{Co}^{60}$  teletherapy machine, 10: 544
- induced luminescence in  $\text{H}_2\text{O}$  by, 10: 3478
- monitoring, design of multi-range instrument for, 10: 3842, 3843
- neutron-capture spectra of, from V, Co, Ti, Fe, Cr, Au, Mn and I, 10: 2174(J)
- nuclear, modification of the one-particle formula for, 10: 2865(J)
- from nuclear reactions produced by  $\alpha$  particles and deuterons, 10: 1575(J)
- oxygenated  $\text{H}_2\text{O}$  formation in aqueous solutions by, 10: 100(J)
- pair production in Pb by  $\text{Bi}^{214}$ , 10: 1911(J)
- pathological effects of total-body exposure, on domestic animals, 10: 1169(R)
- pathological effects on chromosomes in onion root tips, protection conferred by sodium hydrosulfite and BAL, 10: 1197(J)
- pathological effects on mice, 10: 1161(R)
- penetration, effect of spherical voids in water on, 10: 3743
- polymer deterioration by, 10: 1283(J)
- radiolysis of aqueous solutions of oxalic acid by, 10: 101(J)
- radiolysis of water solutions by, 10: 98(J)
- reaction of 19.0- to 30.5-Mev, with Cu, angular distribution and yield, 10: 1068(J)
- recoil atoms from, behavior in solid media, 10: 1941(J)
- reflection from clay, plywood, graphite, cement, Al, steel, and Pb, 10: 2549
- scattering of 100- to 145-Mev, by protons, 10: 3222(R)
- from spheres of  $\text{U}^{233}$  contaminated with  $\text{U}^{232}$ , calculation, 10: 1640
- sterilization and food deterioration following exposure to, 10: 515(R)

## Gamma radiation (cont'd)

- from telecobalt installations, shielding, 10: 1711(J)
- thermal-neutron-capture, relation to nuclear structure, 10: 3224(J)
- from thorium, dosage determinations, 10: 2811
- transmission through air slots, 10: 3393
- transmission through air slots in  $\text{H}_2\text{O}$ , 10: 3394
- transmission through shielding materials, Monte Carlo calculations for, 10: 1095(J)

## Gamma shielding

- nomogram, 10: 2911(J)
- spherical voids in, effect on penetration, 10: 3743
- by structural materials of ORNL Research Reactor, 10: 2561
- of telecobalt installations, effectiveness, 10: 1711(J)

## Gamma sources

- angular distribution of scattered radiation from plane isotropic, 10: 1942(J)
- calibration of a  $\text{Co}^{60}$ , 10: 1101
- design, for teletherapy units, 10: 3256
- design of a  $\text{Co}^{60}$  revolving therapy unit, 10: 48(J)
- design of, using  $\text{Au}^{198}$  for radiotherapy of carcinomas of cervix, 10: 1198(J)
- design of high-intensity  $\text{Co}^{60}$ , 10: 465(J)
- intensity measurements of MTR  $\gamma$  irradiation facility, 10: 2750
- for the irradiation of flour, grains, and cereal products, design, 10: 14
- isodose curves for hectocurie teletherapy
- for pasteurization of meat, design, 10: 2579
- preparation of standard, by electrodeposition, 10: 1607(J)
- preparation of strong, by irradiating smaller pieces, 10: 2922(J)
- radiocesium, for therapeutic use, 10: 2002(J)
- radiocobalt, for therapeutic use, 10: 2003(J)
- for radiopasteurization of food, design, 10: 1162

## Gamma spectra

- measurement, by photographic plate technique, 10: 3649(R)

## Gamma spectrometers

- analysis of radionuclide mixtures using  $\beta$ - $\gamma$  scintillation, 10: 3637
- anticoincidence scintillation, for analysis of fission-product mixtures, 10: 2495(R)
- circuit diagrams, 10: 1466
- design and performance, 10: 2817
- design for fission  $\gamma$  radiation, 10: 320(R)
- design of high efficiency, low energy, 10: 1411(R)
- performance of, in measurements of  $\gamma$  radiation from a large  $\text{Co}^{60}$  source, 10: 1101
- precision curved crystal, design, 10: 2837(J)
- scintillation, calibration of, 10: 1884(J)

## Garlock Fault Area (Calif.)

- geophysical exploration, 10: 1784

## Gas flow

(See also Compressible flow; Convection; Incompressible flow; Liquid flow; Stack disposal; Subsonic flow.)

- applications to measuring techniques, 10: 3294(J)
- boundary layer, on porous diaphragm, study of turbulent, 10: 1340(J)
- compressible, through a channel, 10: 126
- friction factor determinations, for air through hexagonal bundles of tubes, 10: 3004
- in furnace charges, heat transfer from, 10: 139(J)

## Gas flow (cont'd)

in furnace charges heated under non-adiabatic conditions, heat transfer in, 10: 137(J)

heat transfer and pressure losses for, through finned tubes, 10: 131(R)

molecular conductance for air, in pipes of elliptical cross section, 10: 761

one dimensional, integrals of, 10: 773(J)

subsonic, within range of supersonic velocities, limited in downward flow by sudden increase in density which terminates within flow, 10: 774(J)

through nozzles and around profiles at critical velocity, theoretical analysis, 10: 767(J)

variable leak for regulation in monitoring of gaseous diffusion process, 10: 3203

## Gas flow (laminar)

boundary layer equations, 10: 127

## Gas flow (turbulent)

diffusional film characteristics in, mass transfer, dynamic response method, 10: 135(J)

heat transfer coefficient for, flowing through a tube at low temperatures, 10: 3584

mass transfer in packed beds, 10: 121(J)

## Gas-metal systems

phase studies of the metal-H<sub>2</sub> systems, statistical mechanical approach, 10: 1320

## Gaseous diffusion plant coolant systems

Taylor double filled tube systems, 10: 2401

## Gaseous Diffusion Process

monitoring of, design of variable leak for, 10: 3203

## Gases

absorption, effect of pressure on, 10: 1334(J)

absorption, theory and application, 10: 2785(J)

analysis for hydrogen sulfide, 10: 3331

coal and natural sources of, in European countries, 10: 123(J)

compensation theory of ion beams in, 10: 2777(J)

concentrated solutions of, in liquids, theory of, 10: 230(J)

diffusion in, 10: 1334(J)

discharge, measurement of characteristics, 10: 224(J)

dissociation energy by shock wave measurement, 10: 228

electromagnetic pumping, 10: 3076(P)

electromagnetic signal propagation in ionized, 10: 1416(J)

electron scattering by, in strong-focusing synchrotron, 10: 2184(J)

equation of state, 10: 1445(J)

equation of state by shock wave measurement, 10: 228

external friction at low pressure, 10: 3371(J)

fluid-flow separation, apparatus for, 10: 3297(J)

ideal, thermodynamic properties at elevated temperatures, 10: 2783

ionization by  $\alpha$  particles in mixtures of, 10: 2924(J)

ionization equilibrium, influence of particle interactions on, 10: 229(J)

light emission from electrical discharge in, 10: 3370(J)

neutron scattering in inert, 10: 3655

nitrogen oxides removal, 10: 3292

purification of, for ionization chamber, 10: 961(J)

Roseland opacities for mixtures, 10: 920(J)

sampling, from Arco Chemical Plant process, 10: 2321

scattering of positive ions, measurement, 10: 1940(J)

scattering of x rays by, theory, 10: 429(J), 430(J)

separation by reaction with hot Cu, 10: 3486

## Gases (cont'd)

shock waves in binary mixtures, 10: 3832(J)

viscosity at high pressures and absorption phenomena, 10: 1733(J)

work function for ion pairs in polyatomic, for Po  $\alpha$  particles, 10: 1856(J)

## Gasket materials

Kel-F and teflon, properties and testing, 10: 2403(R)

## Gaskets

(See also Pipe joints; Seals and glands.)

design and testing for canned rotor pumps, 10: 3279

Kel-F and teflon, design, properties, and testing, 10: 2403(R)

## Gassaway Member (Tenn.)

uranium distribution, 10: 2062(R)

## Gastrointestinal tract

radiation injuries, effects of shielding on, 10: 1697

## Gateway District (Colo.)

geology, area favorable for U deposits, 10: 1361(J)

## Gateway Quadrangle (Colo.)

stratigraphy, mineralogy, and ore deposits, 10: 1359(J)

## Geiger-Mueller telescopes

(See Coincidence counters.)

## Geiger-Mueller tubes

cathodes, for mica window, preparation, 10: 2126(J)

gas filling techniques, 10: 2486

halogen-quenched, for high-temperature operation, 10: 2123(J)

modifications in, for C<sup>14</sup> counting, 10: 2115(J)

operating instructions, 10: 2487

performance in  $\beta$  counting, factors affecting, 10: 1462

performance in counting tritiated water, 10: 2823(J), 2824(J)

Russian exhibit at Geneva, comments on, 10: 1876(J)

## General Electric Co. Research Lab., Schenectady, N. Y.

progress reports in physical metallurgy, 10: 996(R)

progress reports on development of Zr-base alloys, 10: 188(R)

progress reports on physical metallurgy, 10: 3134(R)

progress reports on research in physical metallurgy, 10: 3286(R)

## Genetics

symposium, 10: 3093

## Geological survey

progress reports on geologic investigations of radioactive deposits, 10: 2067(R)

## Georgia

geology, radiometric reconnaissance, 10: 2064

## Germanium

crystal structure, effects of neutron irradiation, 10: 3133

magnetic properties, 10: 3035(R)

occurrence, mode of, 10: 1817

self-diffusion coefficient of, in pure silver, 10: 996(R)

separation from Be, In, and Ga by paper chromatography, 10: 1246(J)

Germanium isotopes Ge<sup>71</sup>

internal bremsstrahlung in, energy distribution and emission probability of, 10: 447(J)

Germanium isotopes Ge<sup>72</sup>

energy levels, 10: 1903(R)

## Germanium-magnesium crystals

electrical properties, 10: 331(R)

## Germanium oxides

radiation effects, 10: 3845

**Germanium oxides (liquid)**

surface tension at elevated temperature, 10: 1341(R)

**Germanium-silver alloys**

self-diffusion of Ag along grain boundaries of, 10: 3134(R)

**Glass**

blast effects from atomic explosions on, 10: 758

color center formation in, exposed to  $\gamma$  radiation, 10: 1947(J)

electron spin resonance in neutron-irradiated, and x-ray-diffraction analysis of irradiated, 10: 3035(R)

gamma radiation effects, 10: 1947(J)

low temperature thermal expansion, measurement, 10: 3824

neutron attenuation in, 10: 1504(J)

neutron scattering, 10: 3655

preparation of, for  $\gamma$  radiation detectors, 10: 3845

radioinduced coloration, 10: 3845

**Glass electrodes**

behavior in absolute ethanol, 10: 1903(R)

**Glazes**

effects of, on blast damage to windows, 10: 758

**Glen Canyon Group (Colo.)**

geology, 10: 154(J), 155(J), 156(J), 157(J), 158(J), 159(J)

**Glen Canyon Group (Utah)**

geology and mineralogy, 10: 1784(R)

**Glove boxes**

(See Dry boxes.)

**Glucose**

metabolism by lactic acid bacteria, tracer study, 10: 2673(J)

metabolism in mice, tracer study, 10: 3104

**Glycine**

labeled with  $C^{14}$ , synthesis, 10: 3104

metabolism by chick embryos, effects of  $\gamma$  irradiation, tracer study, 10: 1182(J)

metabolism in mice, tracer study, 10: 3104

radiation chemistry, 10: 3165(R)

self-diffusion in aqueous solutions at 25°C, 10: 590(J)

**Glycogen**

radiation effects on, processes in animals exposed to x rays, 10: 533(J)

**Glycolic acid, calcium salts**

labeled with  $C^{14}$ , preparation, 10: 3104

**Gold**

adsorption of 1-hexanethiol on, 10: 3189(R)

alpha reactions ( $\alpha, p$ ), at 40 Mev, 10: 2175(J)

bremsstrahlung differential cross section of, for 0.5- and 1.0-Mev electrons, 10: 2780(J)

diffusion in single crystals of Ag, 10: 3199(R)

electric resistivity, influence of holes in crystal lattice on, 10: 871

electron and positron transmission in, 10: 1441(J)

extraction from hydrochloric acid, 10: 1903(R)

inelastic neutron scattering,  $\gamma$  rays excited by, 10: 432(J)

gamma spectra from neutron capture in, 10: 2496

proton scattering, inelastic, 10: 1506(R)

proton scattering cross section, 10: 1009(R)

radiation effects, 10: 3738

solvent extraction from aqueous solutions, 10: 3329(R)

x-ray excitation of, 10: 331(R)

**Gold (colloidal)**

effects of  $Co^{60}$   $\gamma$  radiation on solutions of, 10: 649(J)

**Gold-cadmium crystals**

crystal structure of irradiated, 10: 3035(R)

**Gold chlorides**

crystal structure of  $Au_3Cl_4$ , 10: 2639

**Gold-copper alloys**

Hall Effect in, 10: 1385

radiation effects, 10: 3368(R)

**Gold-copper compacts**

diffusion, effects of radiation on, 10: 2554

**Gold foils**

preparation, for  $\alpha$  absorption measurements, 10: 1463

sensitivity ratio of, to thermal and resonance neutrons, determination, 10: 949

**Gold isotopes**

search for  $Au^{209}$ , 10: 3295

**Gold isotopes  $Au^{196}$** 

energy levels, 10: 1956(J)

**Gold isotopes  $Au^{197}$** 

conversion electrons from electric excitation of, 10: 2153(J)

energy levels, 10: 1956(J)

neutron reactions (n,p), cross sections for, 10: 1508(R)

**Gold isotopes  $Au^{198}$** 

colloids of, therapy of carcinoma of cervix by, 10: 1198(J)

decay scheme, 10: 467(J)

gamma spectrum analysis, 10: 3651(R)

lymph node uptake of injected, in dogs, 10: 1719(J)

spin and parity assignments, 10: 339(J)

**Gold isotopes  $Au^{199}$** 

pile neutron capture cross section of, 10: 2142(R)

**Gold isotopes  $Au^{200}$** 

beta decay curve, 10: 2142(R)

**Gold-nickel alloys**

Hall Effect in, 10: 1385

**Gold-silver alloys**

annealing, grain structure, hardness, preparation, and stored energy, 10: 3012

Hall effect in, 10: 1385

plastic deformation, effects of annealing, 10: 184(R)

sintering of compacted, with other metallic powders, behavior, 10: 196(J)

x-ray and colorimetric investigations of cold working and annealing, 10: 3012

**Gold-uranium alloys**

alloying theory, 10: 3361

**Goldfields Area (Saskatchewan)**

uranium deposits in, 10: 808(J)

**Gonads**

effects of radiation from injected  $P^{32}$  on ovarian tissue in rats, 10: 1702(J)

effects of x irradiation on rat testis, 10: 34(J)

radiation damage in tissues of rat, at -79°C, 10: 2584(J)

radioinduced degeneration in mice, 10: 2583(J)

**Goniometers**

design, 10: 3852(R)



## Goodrich (B.F.) Co. Research Center, Brecksville, Ohio

progress reports on inorganic polymers, 10: 64(R)

## Goodsprings Mining District (Nev.)

uranium distribution, 10: 1358

## Granite Point Claims (Nev.)

geology, mineralogy, and exploration, 10: 3007

## Graphite

(See also Carbon.)

annealing, effects of radiation on, 10: 2407

annealing characteristics of irradiated, 10: 2497(R)

annealing of neutron irradiated, 10: 3321

annealing of radiation damage in, 10: 3368(R)

brazing, to graphite and metals, alloys for, 10: 864

coating development of  $\text{MoSi}_2$ , 10: 1268

electric and thermal conductivities and magnetic properties of, effects of radiation on, 10: 3368(R)

electric and magnetic properties of irradiated, 10: 2497(R)

electric conductivity, magnetic susceptibility, stored energy, thermal conductivity, thermoelectric properties, and effects of radiation, 10: 3479

electric conductivity, thermal conductivity, and thermoelectric properties, 10: 3472

electron bombardment at liquid He temperatures, and pulse annealing characteristics, 10: 1269(J)

electronic properties of neutron-irradiated small-particle, 10: 2555

energy content, effect of pile irradiation on, 10: 640

erosion by ion beams, 10: 3737

erosion by steel shot, 10: 3471

gamma activity induced in, by reactor radiation, 10: 3678

gamma scattering, 10: 2549

Hall and magneto-resistive effects, measurement and effects of radiation on, 10: 2320

heat capacity in temperature range 1.5 to 4.2°K, and specific heat, 10: 3134(R)

ionization and energy transfer by charged particles in, 10: 2316

lubricity, 10: 203(R)

magnetic susceptibility, 10: 642(J)

magnetic susceptibility, thermal conductivity, electrical resistivity, and thermoelectric power, effects of radiation on, 10: 3405(R)

neutron irradiation effects, number and range of atoms dislodged, 10: 2548

neutron irradiation effects on elasticity, electric and thermal conductivity, and absorptive properties, 10: 3321

penetrating showers produced in, at 2760 m and 25°N geomagnetic latitude, 10: 218(J)

physical properties, radiation effects on, determination, 10: 3322

physical properties and machinability, 10: 1267

preparation, surface properties, adsorptive properties, and effects of radiation, 10: 2021

preparation and properties, 10: 2022

properties of natural and artificial, 10: 3365

purification, by sweep-flow chlorination, 10: 3473

radiation damage, as an indication of fast neutron flux, 10: 2892

radiation damage, low-temperature annealing of, 10: 3738

radiation effects, stored energy, and electrical resistance changes, 10: 2449

radiation effects, and techniques for removal from Hanford reactor, 10: 2315

radiation effects on pile, 10: 2977

## Graphite (cont'd)

reaction with Na, 10: 2648

resistivity changes, exposed to deuteron and  $\alpha$  beams, 10: 2317

resistivity changes and relation to charged particle ranges in, 10: 2318

sintering, 10: 3613

specific heat, effects of annealing and neutron bombardment, 10: 3470

specific heat, effects of B on, 10: 3286(R)

specific heat of, from 1.5 to 20°K, 10: 643(J)

specific heat theory of, 10: 3368(R)

specific heat variations for, 10: 996(R)

spectrochemical determination of trace amounts of B in, 10: 617(J)

stored energy and strains of irradiated, 10: 1270(J)

stored energy of irradiated, 10: 2497(R)

tensile strength at high temperatures, and relation to apparent density at room temperature, 10: 2319

thermal and electric properties, thermal annealing, and stored energy of irradiated, 10: 3307(R)

thermal conductivity, 10: 3469

thermal conductivity, effect of electron-phonon scattering, 10: 3156

thermal conductivity and magnetic properties, effects of radiation on, 10: 3738

thermoelectric power, effect of neutron irradiation on, 10: 2649

x-ray-diffraction pattern of, as a means of distinguishing from amorphous carbon, 10: 624(J)

## Graphite bromides

thermal conductivity and effects of radiation, 10: 3479

## Graphite crucibles

melting of titanium-niobium alloys in furnaces with, 10: 1408(J)

## Graphite crystals

lattice constants at low temperatures, 10: 641(J)

## Graphite moderated reactors

(See also specific graphite moderated reactors, e.g. Brookhaven Reactor; ORNL Graphite Reactor.)

design, 10: 3037

## Graphite powders

lattice constants at low temperatures, 10: 641(J)

## Graphite-uranium systems

thermal utilization and diffusion lengths in lattices of, 10: 1546

## Graphon

(See Carbon black.)

## Greases

(See also Lubricants, Oils.)

properties for lubrication of high speed anti-friction bearings, 10: 1780(R)

silicone, lubricity and performance at high temperature, 10: 2055(R)

## Green Monster Mine (Nev.)

geology, mineralogy, 10: 1358

## Green River Basin (Wyo.)

geophysical exploration, 10: 1354

## Green River Desert Area (Col.-Utah)

geophysical exploration, U distribution, 10: 806

## Grinding

(See also Particles; Powders.)

effects of chemical agents in rock, 10: 3189(R)

## Ground waters

radiometric analysis for U and Ra content, 10: 2248(R)

## Ground waters (cont'd)

- silt deposits in, density determination of, 10: 3063(P)
- uranium recovery, 10: 3550

## Guanidine

- acidic properties in liquid  $\text{NH}_3$ , 10: 1223(J)

## Guided missiles

- reliability, sampling studies, 10: 2109

## Guides

- (See Handbooks and manuals.)

## Guinea pigs

- radiation dosage determinations on, 10: 514

## Gypsum Gap Quadrangle (Colo.)

- geology and mineralogy, 10: 154(J)

## Gypsums

- neutron scattering, 10: 3659(R)

## H

## Hafnium

- crystal bar, corrosion and mechanical properties, 10: 195
- determination by isomeric transitions, 10: 3652(R)
- determination in Zr, by x-ray measurements, 10: 2930(J)
- determination of, in aqueous  $\text{F}^-$  solutions with cupferron, 10: 620(J)
- emission spectrometric analysis for Zr, 10: 1741(J)
- neutron total cross sections, 10: 2449(R)
- occurrence and determination in Zr minerals, 10: 3787
- preparation by calcium reduction of  $\text{HfF}_4$  and properties, 10: 3197
- preparation by Kroll process, 10: 859(R)
- preparation by selective stripping with hexone, 10: 2996
- production, 10: 858(R)
- production in Kroll-process equipment, 10: 1807
- recovery in Zr processing, 10: 3016
- separation by adsorption on  $\text{Zr}_3(\text{PO}_4)_4$  precipitate, 10: 3494(R)
- separation from Zr, production plant, 10: 3200
- separation from Zr, 10: 3794
- separation from Zr, ion exchange, 10: 730(J)
- separation from Zr, pilot-plant process, 10: 3135
- separation from Zr, production plant, 10: 3200
- separation from Zr, thiocyanate method, 10: 2994
- separation from Zr by ether extraction of thiocyanate complexes, 10: 3192
- separation from Zr by solvent extraction, 10: 3482
- separation from Zr by solvent extraction with hexone, 10: 2996
- separation from Zr by solvent extraction with TBP, 10: 2990
- separation from Zr by thiocyanate extraction, 10: 3274
- solvent extraction from Zr, 10: 2989
- solvent extraction from Zr with TBP, 10: 568(R)
- welding to Stellite and stainless steel, preliminary attempts, 10: 2438

## Hafnium alloys

- corrosion in hot  $\text{H}_2\text{O}$ , 10: 859(R)

## Hafnium fluorides

- crystal form and lattice space, 10: 86(J)
- preparation, 10: 3197

## Hafnium-hydrogen systems

- crystal structure determination by neutron and x-ray-diffraction analysis, 10: 3020

## Hafnium isotopes

- separation procedures, 10: 2470

Hafnium isotopes  $\text{Hf}^{176}$ 

- decay schemes, 10: 2158(J)

Hafnium isotopes  $\text{Hf}^{177}$ 

- gamma emission, 10: 3851(R)
- spin of ground state, 10: 1025(J)

Hafnium isotopes  $\text{Hf}^{181}$ 

- beta spectrum, 10: 3656
- coincidence measurements, 10: 3654(R)
- disintegration, 10: 2496

## Hafnium oxides

- crystal structure and optical properties, 10: 3787

## Hafnium oxychlorides

- decomposition of, to produce Hf, 10: 858(R)

## Hafnium silicates

- crystal structure and optical properties, 10: 3787

## Hafnium silicides

- preparation, physical properties, and analysis, 10: 2738(J)

## Hafnium thiocyanates

- separation by solvent extraction, 10: 2995

## Hafnium-thorium alloys

- phase studies, 10: 3196(R)

## Hafnium-titanium alloys

- corrosion, effect of N on, 10: 858(R)
- corrosion in hot  $\text{H}_2\text{O}$ , 10: 859(R)

## Hafnium-zirconium alloys

- tensile properties, 10: 1804

## Halides

- absorption spectra of metal, 10: 1494(J)

## Halogens

- activation determination, 10: 2632(J)
- detection, performance of ionization-type detector, 10: 3327(R)
- heat of formation at 298°K, 10: 1897
- radiolysis of aqueous solutions, absorption spectra, 10: 2214(J)
- solid, theory of bonding in, 10: 3270

## Haloörganic compounds

- (See also Fluoroörganic compounds.)

- analysis for  $\text{F}_2$  and  $\text{Cl}_2$ , 10: 2269
- preparation, 10: 2341
- reactions with organolithium compounds, mechanisms, 10: 575(R)

## Hamm Canyon Quadrangle (Colo.)

- exploration, geology, and mineralogy, 10: 155(J)

## Handbooks and manuals

- on alpha counting, 10: 2112
- on design, calibration, and operation of radiation detection instruments, 10: 954
- for nuclear instrument control console for NTA, 10: 1858
- on radiological education and training, 10: 1993

## Hands

- contaminated, hazards of smoking with, 10: 1703

**Hanford Atomic Products Operation, Richland, Wash.**

- environs monitoring, 10: 2242(R), 3409(R)
- progress reports on biology research, 10: 513(R)
- progress reports on radiological monitoring activities, 10: 3409(R)
- progress reports on radiological science activities, 10: 2242(R)

**Hanford Production Reactors**

- process tube failure, influence of pressure-stress factors, 10: 2442

**Hanford Test Reactor**

- description, 10: 3686

**Hanford waste slurries**

- corrosive effects on Ni, Ni alloys, and stainless steel, 10:3597
- sludge sampler, 10: 3578

**Happy Jack Mine (Utah)**

- geology, mineralogy, U distribution, 10: 180(J)
- uranium distribution, 10: 150

**Hardness**

- methods of measurement, equipment for, 10: 3359
- testing equipment, remote operating Tukon, 10: 3804

**Harmonic analysis**

- neutron transport solutions by, 10: 2489

**Harshaw Chemical Co., Cleveland**

- progress reports, 10: 1291(R)

**Hawaii. Univ., Honolulu. Hawaii Marine Lab.**

- progress reports on radioisotope uptake in marine organisms, 10: 1718(R)

**Hazards**

- (See Dust hazards.)

**Health physics**

- the application of external and internal radiation exposure limits, 10: 1708(J)
- hazards of smoking with contaminated hands, 10: 1703
- public health aspects, 10: 2596(J)
- radiological education and training handbook, 10: 1993
- rules and regulations for hot laboratories, 10: 3412

**Heat exchangers**

- (See also Heat transfer.)

- design and performance for liquid metal systems, 10: 120(R)
- fabrication of tube joints for, 10: 759
- heat transfer in, mathematical analysis, 10: 1779(J)
- materials, stainless steel-carbon steel composite tubes, 10: 2717
- mathematical analysis of circulation loops, 10: 3800
- for nuclear power plants using closed gas turbine, design, 10: 1150
- temperature distribution in convection systems, 10: 130

**Heat flow**

- (See Convection.)

**Heat of polymerization**

- determination by analysis of thermochemical data, 10: 3026(R)

**Heat of sublimation**

- tables of, of elements at 298°K, 10: 1897

**Heat-resisting alloys**

- development for high temperature use, 10: 835
- effects of static compression stresses at temperatures from 1350° to 1800°F on creep in, 10: 142
- preparation and properties of wrought and cast Fe-base and wrought Co-base, 10: 1397

**Heat transfer**

(See also Boiling; Condensation; Convection; Heat exchangers; Thermal conductivity; Thermal radiation.)

- analysis in annular flow, 10: 2697(J)
- bed-wall, in fluidized systems, 10: 769(J)
- between immiscible liquids, 10: 772(J)
- boiling, with liquid metals, 10: 772(J)
- on boiling in pipes, theory of, 10: 1338(J)
- at boiling point of H<sub>2</sub>O, effects of surface tension and viscosity on, 10: 1339(J)
- in circulation loops, temperature and flow-rate calculations, 10: 2695(J)
- coefficients for gases, effects of temperature and radiation on, 10: 769(J)
- convective, from a gas stream to a circular cylinder at high temperature, 10: 772(J)
- in flow reactors, mathematical analysis, 10: 2696(J)
- in fluidized beds, effect of fluid velocity and bed materials, 10: 768(J)
- to fluidized beds, mechanism of, 10: 136(J)
- free convection through liquids between horizontal surfaces, 10: 769(J)
- from gas flow in furnace charges, 10: 139(J)
- from gas flow in furnace charges under non-adiabatic conditions, 10: 137(J)
- generation of steam from liquid metals at high heat fluxes, 10: 772(J)
- from granular material placed in a pipe under non-adiabatic conditions, 10: 138(J)
- from hydrogen flowing through a tube at low temperatures, 10: 3584
- in laminar boundary layers, 10: 132
- mathematical analysis of, in packed beds, 10: 1779(J)
- measurement for gas flow through tubes, 10: 131(R)
- molten metal, effects of wetting and gas entrainment, 10: 769(J)
- nonisothermal flow inside vertical tubes, 10: 772(J)
- by nucleate boiling, 10: 2698(J)
- in packed beds, 10: 134(J)
- porous wall, for aircraft de-icing, 10: 124
- pressure effects on steam-water density, 10: 3352
- properties of liquid-solid suspensions, 10: 769(J)
- in reactors, theory, 10: 1336, 1337
- in single-phase natural-circulation H<sub>2</sub>O loop systems, analysis, 10: 3800
- in solid-state reactions, kinetics, 10: 1335
- in SIR, testing of components for, 10: 1775(R)
- theory and experiments in fluids with a volume heat source, 10: 129
- thermal entrance region, in liquid metal systems, 10: 772(J)
- for two-phase, two-component flow, 10: 769(J)
- of viscous materials in agitated kettles, 10: 772(J)

**Heat transfer conferences**

- papers presented at Brookhaven in October, 1954, 10: 2054

**Heaters**

(See also Furnaces; Induction furnaces.)

- single-layer coil, inductance tables for, 10: 3826

**Heavy water**

(See Water-d<sub>2</sub>; Water-d<sub>3</sub>.)

**Heavy water reactors**

(See also specific heavy water reactors, e.g. Argonne Research Reactor; Homogeneous Reactor Test.)



## Heavy water reactors (cont'd)

- calculations for 10 Mw, core volume and reactivity as functions of lattice parameters, 10: 1929(J)
- chemical researches and problems, review, 10: 3681
- design, 10: 3658
- design of semi-works H<sub>2</sub>O-cooled, heterogeneous, 10: 3683
- engineering design of homogeneous, 10: 3684
- engineering problems in H<sub>2</sub>O-cooled, heterogeneous, 10: 3682
- fuel systems, feasibility of UF<sub>6</sub> circulation by thermal syphon, 10: 3685
- hazards from fission product heat in accident to, 10: 2167
- heat transfer and D<sub>2</sub>O utilization, 10: 3714
- neutron flux distributions in unit cells, 10: 3889
- solubility in U, 10: 3415
- neutron flux distribution in U-D<sub>2</sub>O mockup of UPR, 10: 2544(R)

## Helium

- analysis for O<sub>2</sub>, 10: 2258(R)
- collision cross sections for electrons, 10: 1437(J)
- electron loss by fast, in H, He, N, O, Ne, and A, 10: 3144(R)
- high frequency discharge in, probe methods for investigation, 10: 2773(J)
- impulse discharge in, from 50 to 110 kev, 10: 226(J)
- ionization by  $\alpha$  particles, effects of contamination by other gases on, 10: 2924(J)
- isotope shift in atomic spectra, calculation of, 10: 3654(R)
- isotope shifts in spectrum of, relation to nuclear motion, 10: 2880(J)
- leaks, detection with line recorder, 10: 3476
- solubility in H<sub>2</sub>O and aqueous UO<sub>2</sub>F<sub>2</sub> and UO<sub>2</sub>SO<sub>4</sub> solutions, 10: 3121
- stripping of singly charged A ions by, 10: 1568(J)
- thermal conductivities and accommodation coefficients of, for chrome surfaces at reduced pressures, 10: 2782

## Helium (liquid)

- compressibility and heat transfer, measurement using thermomechanical effect, 10: 762
- diffusion and thermodiffusion in weak solutions of He<sup>3</sup> in, 10: 1413(J)
- properties under high velocity rotation, 1: 1414(J)

## Helium ions

(See also Alpha particles.)

- fission product distribution curves from U<sup>238</sup> bombardment, 10: 2240(J)
- scattering in gas stripping, 10: 1943(J)

Helium ions (He<sup>4</sup>)

(See Alpha particles.)

## Helium isotopes

- dew points of He<sup>3</sup>-He<sup>4</sup> mixtures, 10: 308(J)
- mass spectrographic determination, 10: 2340

Helium isotopes He<sup>3</sup>

- adsorption on activated charcoal, 10: 200
- deuteron capture, 10: 1507(R)
- diffusion and thermodiffusion in weak solutions of, in He II, 10: 1413(J)
- liquid "cell" model applied to, and thermodynamic properties, 10: 2754(J)
- neutron reactions (n,p), and neutrino mass, 10: 3650(R)
- neutron transformation in, application to neutron spectroscopy, 10: 965(J)
- nuclear reactions with, 10: 1411(R)
- proton distribution from Be<sup>9</sup>(He<sup>3</sup>,p)B<sup>11</sup> reaction, 10: 1507(R)
- surface tension measurements from 0.93 to 3.34°K, 10: 309(J)
- transition temperatures in He<sup>4</sup> solutions, 10: 1491(J)

Helium isotopes He<sup>4</sup>

- adsorption on activated charcoal, 10: 200
- analysis of  $\pi^- + \text{He}^4$  reaction, 10: 3032
- cosmic hyperfragment, non-mesonic decay, 10: 2099(J)
- excited states, 10: 3152(J)
- mechanism of Li<sup>7</sup>( $\gamma$ ,H<sup>3</sup>)He<sup>4</sup>, 10: 389(J)
- scattering of polarized neutrons by, spin-orbit type splitting of He<sup>5</sup> levels from, 10: 1026(J), 2869(J)
- second virial coefficients of He<sup>3</sup>-He<sup>4</sup> mixtures between 2 and 4°K, 10: 1417(J)
- transition temperatures, 10: 1491(J)

Helium isotopes He<sup>6</sup>

- energy levels, spin orbital splitting, in scattering of polarized neutrons by He<sup>4</sup>, 10: 2869(J)
- spin-orbit type splitting of levels of, in scattering of polarized neutrons by He<sup>4</sup>, 10: 1026(J)

Helium isotopes He<sup>8</sup>

- beta decay and shell model with intermediate coupling, 10: 328(J)

## Hell Creek Formation (S. Dak.)

- geology, 10: 1790(J)

## Hemins

- action on isonicotinic hydrazides, 10: 3094(J)

## Hemocyanins

- serologic reactions, effects of radiation, 10: 2576

## Hemoglobin

(See also Erythrocytes.)

- meth-, formation in rats, effects of radiation, 10: 1989(J)

## Hemolysins

- production of, in irradiated mice, effects of injected spleen or bone-marrow-homogenates, 10: 522(J)

## Hemorrhage

- radioinduced, 10: 2598(J)

## Heparin

- effects on blood picture in dogs, 10: 3408(R)
- effects on concentration of fatty acids in lymph, 10: 3

## Heptane

- chlorination, 10: 2310(R)

## Heptane, polychloro-

- chlorination, 10: 2341
- fluorination, 10: 2310(R), 2341(R)

## Heptane, polychloropolyfluoro-

- fluorination, 10: 2310(R)

## Heterocyclic compounds

- synthesis and analytical uses, 10: 2997

## Heterogeneous boiling reactors

- control, 10: 1585(J)
- design and reactivity, useful formulas, 10: 1031
- heat transfer during power transients of Borax II, 10: 3861
- reactivity transients, self-limitation of power in Borax-I experiments, 10: 1921
- self-regulation by moderator boiling in stainless steel - UO<sub>2</sub> - H<sub>2</sub>O, 10: 3150
- temperature excursion data from Borax experiments, use to predict reactor transient behavior, 10: 2900(J)

## Heterogeneous reactors

(See also specific heterogeneous reactors, e.g. Brookhaven Reactor; ORNL Graphite Reactor.)

- design of semi-works H<sub>2</sub>O-cooled, D<sub>2</sub>O-moderated, 10: 3683
- engineering problems in H<sub>2</sub>O-cooled, D<sub>2</sub>O-moderated, 10: 3682

- Heterogeneous reactors (cont'd)**  
 gamma dosage in, 10: 2899(J)  
 neutron flux distribution in thermal columns, 10: 2523
- Heteropoly acids**  
 sedimentation and diffusion properties of phosphomolybdic and phosphotungstic acids, 10: 70(J)
- 1,5-Hexadien-3-yne**  
 preparation and catalytic reduction, 10: 3795
- Hexane**  
 preparation of tritium-labeled, 10: 3795  
 purification for spectrochemical analysis, 10: 3245(J)
- 1-Hexanethiols**  
 adsorption on Cu, 10: 3189(R)
- High temperature alloys**  
 (See Heat-resisting alloys.)
- High temperature reactions**  
 review of high-temperature production methods, 10: 2770(J)
- High temperature separation processes**  
 purification of metals by zone melting, theory, 10: 3193  
 recovery of trace metals by distillation of amalgams, 10: 3493
- Hirsutism**  
 excretion in rats, effects of x irradiation and compound 48/80, 10: 2967
- Holbrook Area (Ariz.)**  
 geology, 10: 796
- Holmium**  
 magnetic properties from 23°K to 300°K, 10: 331(R)
- Holmium isotopes  $\text{Ho}^{165}$**   
 nuclear moments, 10: 1532(J)
- Holmium isotopes  $\text{Ho}^{166}$**   
 beta emission, 10: 3656
- Homogeneous boiling reactors**  
 design of research, 10: 1067(J)  
 shielding calculations, 10: 2534
- Homogeneous Reactor Experiment**  
 bubble formation in core, 10: 3697  
 criticality with low enrichment, high concentration  $\text{UO}_2\text{SO}_4 - \text{H}_2\text{O}$  solution, 10: 3700  
 design, 10: 3694  
 design of reactor chamber, 10: 3689  
 shielding, slow neutron fluxes in concretes for, 10: 3699
- Homogeneous Reactor Test**  
 charcoal bed operation at 10 Mw reactor power, 10: 3705  
 core scale-up, and flow and pressure drop in models, 10: 3675  
 fuel solution analysis for sulfate, 10: 3177  
 shielding recommendation for top plug, 10: 3744  
 shielding requirements for dump tank, 10: 3704
- Homogeneous reactors**  
 (See also specific homogeneous reactors, e.g. Homogeneous Reactor Experiment; Homogeneous Reactor Test.)  
 engineering design of  $\text{D}_2\text{O}$ -moderated, 10: 3684  
 chemical researches and problems, review, 10: 3681  
 control, calculation of reflector discharge time, 10: 3693  
 criticality studies of enriched, 10: 3151  
 decontamination procedures for loops contaminated with radioactive Zr and Nb, 10: 3703
- Homogeneous reactors (cont'd)**  
 design and safety aspects of KEWB, 10: 3316  
 engineering design of  $\text{D}_2\text{O}$ -moderated, 10: 3684  
 fission product formation, 10: 1547  
 fuel circulation, use of thermal syphon for, 10: 2522  
 heat transfer and  $\text{D}_2\text{O}$  utilization, 10: 3714  
 neutron energy spectra in  $\text{H}_2\text{O}$ - and  $\text{D}_2\text{O}$ -moderated, 10: 3377  
 reactivity contribution from delayed neutrons, calculations, 10: 2531
- Hoods**  
 (See Laboratory furniture.)
- Hooker Electrochemical Co., Niagara Falls, N. Y.**  
 progress reports on condensation-type polymers, 10: 738(R)
- Horizons, Inc., Cleveland**  
 progress reports on crystal growth from electrolysis in molten salt systems, 10: 2766(R)  
 progress reports on determination of coefficients of surface diffusion of metals, 10: 889(R)
- Hormones**  
 (See also specific hormones, e.g. Adrenocorticotrophic hormone; Cortisone.)  
 effect on renal clearance of  $\text{I}^{131}$  in rats, 10: 1204(J)
- Hot Brook Canyon (S. Dak.)**  
 exploration, mineralogy, and U occurrence, 10: 1789(J)
- Hot cells**  
 (See Caves.)
- Huerfano Embayment (Colo.)**  
 geophysical exploration and geology, 10: 801
- Hunt's Mine (Utah)**  
 plan and section of, in Poison Spring Canyon Area, 10: 800
- Hyaluronic acid**  
 size and shape of, from vitreous humor, 10: 1693
- Hyaluronic acid, sodium salts**  
 separation from human umbilical cords, 10: 2993
- Hydraulic fluids**  
 corrosive effects, oxidation, and thermal properties, 10: 892(R)  
 properties, for use in aircraft equipment cooling systems, 10: 764
- Hydraulic packing**  
 (See also Seals and glands.)  
 testing in Zr process solutions, 10: 3278
- Hydrazides**  
 reactions with hydrogen peroxide, chemiluminescence as a measurement of hydrogen peroxide, 10: 2027(J)
- Hydrazides, isonicotinic-**  
 inhibiting effects on mycobacteria, 10: 3094(J)
- Hydrazine**  
 (See also Ammonia-hydrazine systems.)  
 radiolysis of aqueous solutions, 10: 1272(J)  
 thermodynamic properties from 25 to 2000°K, 10: 1721  
 toxicology of, a review, 10: 547
- Hydrazine-ammonia systems**  
 stability, effect of  $\text{KNH}_2$  and  $\text{K}_2\text{SO}_4$  on, 10: 577
- Hydrazyl, diphenylpicryl-**  
 paramagnetic resonance in, x-irradiation effects on, 10: 2217(J)  
 radiolysis and photolysis, 10: 1729(R)
- Hydrides**  
 density and crystal structure, 10: 1728(R)

## Hydrides (cont'd)

- preparation from organometallic compounds, 10: 1320
- preparation of transition metal, 10: 1641

## Hydriodic acid

- corrosive effects on Ta, Hastelloy C, and Duriron, 10: 3594
- photolysis of D-labeled, hot-atom reactions, 10: 2641(J)

## Hydroaromatic complexes

- with nitrobenzenes, infrared spectra, 10: 3048

## Hydroaromatic compounds

- boiling and melting points of low molecular weight polynuclear, literature survey, 10: 1730
- chlorination, effect of  $\gamma$  radiation, 10: 2025
- polynuclear, physical properties, lubricity, and synthesis, 10: 737(R)
- synthesis of perfluoro-, 10: 3603

## Hydrocarbons

(See also Deuteriocarbons.)

- chlorination, effects of  $\gamma$  radiation on aromatic, 10: 1280(J)
- magnetic resonance spectra, 10: 201
- properties, for use in aircraft equipment cooling systems, 10: 764

## Hydrochloric acid

- ionization constant in  $\beta,\beta'$ -dichlorodiethyl ether, 10: 1903(R)
- production and consumption of, in processing carnotite, 10: 2267
- recovery from U ore processing plant, 10: 2662
- solubility of  $\text{Fe}_2\text{O}_3$  in, effects of proton irradiation on, 10: 655(J)
- solubility of Pu oxalates and Pu phosphates in, 10: 3504

## Hydrochloric acid-ethane systems

- phase studies, 10: 1334(J)

## Hydroclones

(See Cyclone separators.)

## Hydrocyanic acid

- thermodynamic functions of HCN, DCN, and TCN, 10: 1726

## Hydrofluoric acid

- chemical reactions with U oxides, 10: 3542
- concentration control, design of conductance cells for, 10: 3466
- condensation, 10: 3467
- electrolysis, in production of F, 10: 2313
- infrared spectra analysis for, effect of  $\text{SO}_2$  and  $\text{F}_2$  on, 10: 3883
- recovery, from electrolytic fluorine cells, 10: 3468
- storage tank content measurement, 10: 924
- thermodynamic properties from 25 to 2000°K, 10: 1721

## Hydrofluoric acid-chlorine fluoride systems

- phase studies and electric conductivity, 10: 633

## Hydrofluoric acid-iodine fluoride system

- phase studies and electric conductivity, 10: 632

## Hydrofluoric acid-nitric acid systems

- corrosive effects on stainless and Nb steels, 10: 3806
- corrosive effects on Zr and stainless steel and solubility in, 10: 3129

## Hydrofluoric acid-sulfur dioxide systems

- phase studies, 10: 636

## Hydrofluoric acid-sulfuric acid systems

- corrosive effects on Ni, Ni alloys, and stainless steel, 10: 3597

## Hydrofluorination

- of uranium dioxide and plutonium dioxide, heat of reaction and equilibrium constants, 10: 3507

## Hydrogen

- absorption by cast Al alloys, 10: 845

## Hydrogen (cont'd)

- atomic, formation in irradiated acids, 10: 2218(J)
- bonding, 10: 570(R)
- bonding, deuterium effect in, 10: 569(R)
- concentrated solutions of, at high pressures, 10: 230(J)
- diffusion in Ti and Ti alloys, 10: 1389
- effect on mechanical properties of Ti and Ti alloys, 10: 2080(R)
- effects of, on tensile properties of U, 10: 1143
- effects of atmospheric content of, on radiosensitivity of bean roots, 10: 539(J)
- effects on embrittlement of Ti-Mn alloys, 10: 856
- electrolytic production, 10: 2329(R)
- embrittling effects on Ti and Ti alloys, 10: 2729
- embrittling effects on Zr and Sn-Zr alloys, 10: 3015
- exchange between  $\text{H}_2$  and  $\text{H}_2\text{O}$ , effect of Pt and Ni catalysts on, 10: 2305(R)
- exchange in aldehydes saturated with deuterophosphoric acid, 10: 598(J)
- exchange reaction of, in dibasic saturated carboxylic acids, 10: 600(J)
- exchange reactions between  $\text{PH}_3$  and  $\text{H}_2\text{O}$ , 10: 2308
- exchange reactions in aldehydes, 10: 601(J)
- exchange reactions with deuterium, 10: 2306
- exchange reactions with liquid ammonia, 10: 2307
- exchange with  $\text{D}_2$  in the 560°C temperature range, 10: 631(J)
- gasometric determination in U rods, 10: 2377
- heat transfer coefficient for, flowing through a tube at low temperature, 10: 3584
- high frequency discharge in, probe methods for investigation, 10: 2773(J)
- ionization of 2s and 2p states, by electrons, 10: 2915(J)
- meson ( $\pi^-$ ) reactions, total cross sections for 140 to 400 Mev, 10: 272(J)
- meson ( $\pi^0$ ) formation by 4'-Mev neutron reactions in, 10: 276(J)
- $\pi^-$  meson scattering at 165 Mev, cross sections and phase shift analysis, 10: 280(J)
- $\pi^+$  meson scattering at 189 Mev, cross sections and phase shift analysis, 10: 281(J)
- neutron transport cross sections, calculation, 10: 3220
- ortho-para conversion, effect of ferric hydroxide gel on, 10: 2755(J)
- oxidation at liquid air and at room temperatures by oxygen atoms, 10: 2619(J)
- photomeson production, 10: 298(J)
- proton energy losses in, 10: 1093(J)
- purification, following recovery from electrolytic fluorine cells, 10: 3468
- solubility in benzene, heptane, and hexadecafluoroheptane, 10: 2461
- solubility in  $\text{UO}_2\text{F}_2$  at elevated temperatures, 10: 2681
- solubility in  $\text{UO}_2\text{SO}_4$  solutions and  $\text{H}_2\text{O}$  at elevated temperatures, 10: 2680
- solubility in  $\text{H}_2\text{O}$  and aqueous  $\text{UO}_2\text{F}_2$  and  $\text{UO}_2\text{SO}_4$  solutions, 10: 3121
- solubility in zirconium hydride, 10: 2258(R)
- thermal conductivities and accommodation coefficients of, for chrome surfaces at reduced pressures, 10: 2782
- thermodynamic properties from 25 to 2000°K, 10: 1721
- total cross section for 150- to 750-Mev positive and negative pions, measurement and theory, 10: 362(J)
- ultraviolet radiation from, following  $\alpha$  irradiation, 10: 2786(J)

## Hydrogen (liquid)

- handling, 10: 1217
- release in vacuum chambers, safety hazards, 10: 919

## Hydrogen-cerium systems

- phase studies, 10: 2033(J)



- Hydrogen-deuterium systems**  
 radiation-induced exchange, 10: 89(J)
- Hydrogen-hafnium systems**  
 crystal structure determination by neutron- and x-ray-diffraction analysis, 10: 3020
- Hydrogen ion concentration**  
 conductometric determination in  $\text{Al}(\text{NO}_3)_3$  solutions, 10: 1235
- Hydrogen ions**  
 (See also Protons.)  
 dissociation of molecular, in mass spectrometer, 10: 997(J)  
 electron detachment by, cross sections for, 10: 3144(R)
- Hydrogen isotopes**  
 isotopic exchange reactions with water, tables of, 10: 63  
 mesonic decay of  $\text{H}^3$  or  $\text{H}^4$ , 10: 986(J)  
 separation by convection diffusion, 10: 2799(J)
- Hydrogen Isotopes  $\text{H}^2$**   
 (See Deuterium.)
- Hydrogen isotopes  $\text{H}^4$**   
 formation in emulsion, from capture of  $\Sigma^-$  hyperon, 10: 2130(J)  
 observation in nuclear disintegration, 10: 990(J)
- Hydrogen-lanthanum systems**  
 phase studies, 10: 2033(J)
- Hydrogen moderated reactors**  
 (See also Homogeneous reactors; Water moderated reactors.)  
 neutron flux in infinite, calculations of, 10: 1000
- Hydrogen-neodymium systems**  
 phase studies, 10: 2033(J)
- Hydrogen-palladium systems**  
 neutron-diffraction analysis, 10: 3144(R)
- Hydrogen peroxide-water systems**  
 radiation chemistry, 10: 3339
- Hydrogen peroxide-water- $\text{D}_2$  systems**  
 radiation chemistry, 10: 3339
- Hydrogen peroxides**  
 analysis and decomposition in sodium chromate solutions, 10: 2277  
 concentration within a nucleus, equations for estimating, 10: 1181(J)  
 decomposition, 10: 2359  
 determination of micro amounts by chemiluminescence, 10: 2027(J)  
 as precipitant for uranyl salt solutions, 10: 1817  
 production of, in aerated water by fast neutrons, 10: 97(J)  
 radiolysis in aqueous solutions, 10: 3339  
 role in radioinduced mutagenesis in *Paramecium*, 10: 1986(J)  
 thermodynamic properties of D-labeled, 10: 2642(J)
- Hydrogen-praseodymium systems**  
 phase studies, 10: 2033(J)
- Hydrogen sulfides**  
 infrared spectra, 10: 2947(J)  
 iodimetric determination in gas mixtures, 10: 3331
- Hydrogen-titanium systems**  
 (See also Titanium hydrides.)  
 constitution diagrams, 10: 2729  
 crystal structure determination by neutron- and x-ray-diffraction analysis, 10: 3020  
 plastic deformation and tensile properties, 10: 1396
- Hydrogen tritides**  
 vapor pressure at 20°K, 10: 2235(J)
- Hydroxides**  
 solubility of, in some rare earth, 10: 658(J)
- Hydroxylamine hydrochloride**  
 inhibitor in ZnBr shielding windows, radiation breakdown of, 10: 444(J)
- Hyperons**  
 binding energy of  $\Lambda^0$  particles in nuclear fragments, 10: 1916(J)  
 charged and neutral, decay, 10: 2101(J)  
 decay, 10: 985(J)  
 decay, phase space prediction of, 10: 3846  
 differential energy spectrum of  $\Lambda^0$ , corrected data, 10: 2128(J)  
 emission from stars formed by capture of K mesons in nuclear emulsions, 10: 2129(J)  
 formation theory, study from nucleon excitation states, 10: 2143(J), 3223(J)  
 interaction in flight, 10: 1488(J)  
 interaction of  $\Sigma^-$ , in flight, 10: 288(J)  
 isotopic spin formalism and classification of heavy fundamental particles, 10: 322(J)  
 lectures on, by B. Rossi, 10: 324(J)  
 mass and decay scheme determinations, 10: 300(J)  
 nuclear capture of, unstable fragment produced on, 10: 984(J)  
 photonic decay, 10: 3854  
 production, 10: 292(J)  
 production of, with heavy mesons, 10: 291(J)  
 spin and parity of  $\Lambda^0$  and  $\Sigma^-$  particles from cascade decay, 10: 290(J)
- Hyperons—( $\Xi$ )**  
 production in cosmic radiation, 10: 2096(J)
- Hyperons ( $\Sigma^-$ )**  
 capture in emulsion, unstable  $\text{H}^4$  fragment from, 10: 2130(J)
- Hypoxia**  
 (See Anoxia.)
- Idaho (Bonneville Co.)**  
 exploration of Driggs Area in, 10: 151
- Idaho (Lemhi Co.)**  
 exploration of Salmon Area in, 10: 151
- Idaho (Teton Co.)**  
 exploration of Driggs Area in, 10: 151
- Igneous deposits**  
 occurrence in Goodspring Mining District, 10: 1358
- Igneous deposits (Nev.)**  
 occurrence in Moonlight Mine, 10: 1355  
 occurrence in Moonlight Mine and Granite Point Claims, 10: 3007
- Illinois Inst. of Tech., Chicago. Armour Research Foundation**  
 progress reports on heat treatment of Zr-base alloys, 10: 1370(R)  
 progress reports on impact properties of steels, 10: 1381  
 progress reports on rare-earth separations in stainless steels, 10: 1242(R)  
 progress reports on Ti-alloy systems, 10: 861(R)
- Illinois. Univ., Urbana**  
 progress reports, 10: 2625(R)

**Ilmenites**

- preparation and chlorination of titaniferous slag from Idaho, 10: 1735(J)
- smelting of Idaho, production of Ti and Fe from, 10: 1808

**Impact shock**

- dynamic stress relations for annealed 2S Al under, 10: 178

**Incompressible flow**

(See also Compressible flow.)

- Taylor instability at boundary, mathematical analysis, 10: 125
- turbulent boundary layer in liquid, on porous diaphragm, 10: 1340(J)

**Indexes**

- on radioinduced sterilization of food, 10: 18
- of University of Rochester AEC reports, 10: 3092

**Indian Creek Area (Utah)**

- geophysical exploration, U distribution, 10: 806

**Indicators**

(See Level indicators.)

**Indium**

- determination in In-Pb alloys, 10: 62
- gravimetric determination in In-Pu solutions, 10: 2282
- low-temperature properties, 10: 2746(J)
- neutron elastic scattering cross sections, 10: 1088
- neutron total cross sections, comparison of measured and calculated values, 10: 2146
- photon elastic scattering cross-section measurement, 10: 434(J)
- proton scattering, 10: 1903(R)
- separation from Be, Ge, and Ga by paper chromatography, 10: 1246(J)
- solvent extraction from HCl solutions with  $\beta$ ,  $\beta$ -dichloroethyl ether, 10: 3329(R)

**Indium-antimony alloys**

- magnetic susceptibility and neutron irradiation, 10: 3035(R)

**Indium compounds**

- emf-temperature calculations for  $\text{In}_2(\text{SO}_4)_3$ , 10: 3211(R)

**Indium films**

- replacement coatings on Zr, 10: 3358

**Indium foils**

- resonance to thermal neutron density ratio measured by, 10: 1495
- sensitivity ratio of, to thermal and resonance neutrons, determinations, 10: 949
- thermal neutron activation breakdown of, 10: 2863(J)

**Indium isotopes**

- relative abundance, 10: 2494(R)

**Indium isotopes  $\text{In}^{107}$** 

- decay schemes, 10: 2204(J)

**Indium isotopes  $\text{In}^{113}$** 

- fluorescence yields, K-series, 10: 1523(J)

**Indium isotopes  $\text{In}^{114}$** 

- gamma ray spectrum, 10: 2945(J)

**Indium isotopes  $\text{In}^{115}$** 

- cross section for photoexcitation of isomeric state, 10: 355(J)
- neutron reaction ( $n, \alpha$ ), cross section measurement, 10: 365(J)
- photon reactions ( $\gamma, \gamma'$ ), activation curve, 10: 1506(R)
- polarization, 10: 320(R)

**Indium isotopes  $\text{In}^{116}$** 

- beta emission, 10: 3656

**Indium-lead alloys**

- analysis for In, 10: 62

**3-Indoleacetic acid**

- effects of radiation on, 10: 656(J)

**5-Indolol, 3-(2-aminoethyl)-**

- blood plasma activity, effects of irradiation in rats, 10: 3767

**Induced radioactivity**

- gamma activity in reactor materials, method of calculating, 10: 2021(J)

**Induction furnaces**

(See also Furnaces; Heaters.)

- design and operation, for high vacuum-high temperature applications, 10: 1833(J)

**Induction heating**

- tables for single-layer coils, 10: 3826

**Industrial hygiene**

- problems associated with uranium mining operations, 10: 542(J)
- procedures for the evaluation of occupational exposures to dusts, 10: 10
- radiological education and training handbook, 10: 1993
- survey of personnel exposures to radioactive dusts from Th rolling, 10: 1188
- toxic effects of exposure to resins and plastics on industrial workers, 10: 549(J)

**Inert gases**

(See Rare gases.)

**Infrared radiation**

(See also Thermal radiation.)

- transmission in atmosphere, 10: 1838

**Infrared spectra**

- of albumin, alteration by radiation, 10: 525(J)
- relationship between, and the frequencies of isotopic molecules, 10: 3306
- vibrational frequencies in molecules, calculations, 10: 1119(J)

**Infrared spectroscopy**

- equipment design, 10: 1722
- gas cell for corrosive materials at medium temperatures, 10: 1961(J)

**Insects**

- control of, in stored flour, grains, and cereal products, by exposure to  $\gamma$  radiation, 10: 14
- regeneration following irradiation with x rays, 10: 1177(J)

**Inspection and control**

- of radioactive materials for peacetime uses, 10: 2596(J)

**Instrumentation**

- manual for NTA nuclear control, 10: 1858

**Instruments**

- for focusing of atomic beams, 10: 2104(J)
- literature guide, 10: 2787
- pneumatic-measuring, design and applications, 10: 3294(J)
- thermocouple short-circuit detector, 10: 3833

**Insulators**

(See Ceramic insulators.)

**Insulin**

- labeled with  $^{131}\text{I}$ , in vivo effects of x irradiation, 10: 2608(J)

**Interferometers**

(See also Optical systems; Spectrometers.)

- design, in vacuum housing, 10: 2211(J)
- theory of Fabry-Perot, with finite apertures, 10: 2212(J)

**Intermediate reactors**

(See also Submarine Intermediate Reactor.)

- group theory, 10: 3718

**Intermediate Scale Homogeneous Reactor**

- criticality at 250 and 100°C, effects of poisons on, 10: 3702

**Internal conversion**(See also Conversion electrons.)coefficient ratios for the L subshell in  $\text{Lu}^{177}$  and  $\text{Tb}^{160}$ , 10: 1518

coefficients, calculation, 10: 247(J)

**Intestine**(See also Gastrointestinal tract.)

glucose absorption from, effects of x irradiation on, in mice, 10: 531(J)

penetration by bacteria following x irradiation of mice, 10: 3250

radiosensitivity in mice, 10: 3768(J)

**Invar**(See Iron-nickel alloys.)**Inyan Kara Group (S. Dak.)**

exploration, mineralogy, and U occurrence, 10: 1789(J)

**Iodate complexes**

with silver, formation, 10: 62

**Iodide ions**dissociation constants of the  $\text{I}_3^-$  ion, 10: 1220(J)**Iodine**

activation determination, 10: 2632(J)

corrosive effects on Fe, 10: 2707(J)

equilibrium constants for the triiodide ion,  $\text{I}_3^-$ , dissociation, 10: 1220(J)

metabolism, effects of salivaryectomy and thyroidectomy in rats, tracer study, 10: 1698(R)

molecular properties of solid, 10: 3270

neutron-capture  $\gamma$ -ray spectrum, 10: 2174(J)neutron reactions ( $n, \alpha$ ), ( $n, p$ ), and ( $n, \gamma$ ), and use as neutron detector, 10: 3646

recovery from Ce slag, 10: 1817

**Iodine fluoride-hydrofluoric acid systems**

phase studies and electric conductivity, 10: 632

**Iodine fluorides**

electric conductivity, 10: 632

electrical properties and molecular structure, 10: 91(J)

magnetic susceptibilities, 10: 92(J)

**Iodine isotopes**

gamma spectra, from MTR fission product monitoring, 10: 3147

**Iodine isotopes  $\text{I}^{127}$** 

nuclear moments, 10: 2156(J)

nuclear quadrupole resonance, 10: 2878(J)

**Iodine isotopes  $\text{I}^{128}$** 

decay schemes, 10: 2940(J)

**Iodine isotopes  $\text{I}^{129}$** 

relative abundance, 10: 3745(R)

**Iodine isotopes  $\text{I}^{131}$** 

long-term effects of, in rats, 10: 1(R)

pathological effects of chronic exposure in sheep, 10: 2577

pathological effects on rat pituitary, 10: 3251

permissible limits for sheep, 10: 3410

radiometric determination in tissues, sample preparation, 10: 3769(R)

in radiotherapy of thyrotoxicosis and tracer studies of thyroid diseases, 10: 1714(J)

renal clearance in rats, effects of hormones, 10: 1204(J)

separation and purification of fission product, equipment and process, 10: 720

in therapy of thyroid carcinoma, 10: 2601(J)

in therapy of toxic adenomatous goiter, 10: 1716(J)

thyroxine labeled with, following therapeutic uses, 10: 1715(J)

**Iodine isotopes  $\text{I}^{131}$  (cont'd)**

toxic effects following chronic administration to sheep, 10: 3774

toxic effects of chronic doses of, in sheep, 10: 513(R)

toxicity, following chronic oral administration to sheep, 10: 1163

toxicology, 10: 2242(R)

**Iodine isotopes  $\text{I}^{136}$** 

gamma spectra, 10: 3856

**Iodine isotopes  $\text{I}^{137}$** 

half lives, 10: 3650(R)

**Iodine isotopes  $\text{I}^{138}$** 

half lives, 10: 3650(R)

**Ion beams**(See also beams identified by particles, e.g. Neutron beams and specific ion beams, e.g. Nitrogen ion beams.)

compensation theory of, volume charge in stable state, 10: 2777(J)

current integrators for calutrons, design, 10: 1691(P)

effects on phosphor luminescence, 10: 1098(J)

energy stabilization, in electrostatic generators, 10: 1590(J)

erosive effects on graphite, 10: 3737

inelastic scattering processes, 10: 1444(J)

production of multiply charged, in linear accelerators, 10: 3046

space charge effects during diffusion, 10: 3019(J)

**Ion exchange**(See also Adsorption; Ion exchange processes; Ion exchangers.)

migration of ions in resins during electrolysis, 10: 2256(R)

as a property of cells and tissues, review, 10: 4

theory, mathematical analysis, 10: 1756(J)

uranium elution characteristics, 10: 724(R)

**Ion exchange materials**(See also Anion exchange materials.)

efficiency in U recovery, 10: 107(R), 3114

performance and porosity of Amberlite IRA-400 for U recovery, 10: 722(R)

performance in separation of Cu, Fe, Ni, and uranyl ions from plant waste solutions, 10: 3491

sorptive properties for U, testing equipment for, 10: 3347

**Ion exchange processes**

equipment for U recovery from shale plant, 10: 2999(R)

for fission product removal, 10: 2327

uranium and V recovery by, and cost estimates for, 10: 703(R)

**Ion exchangers**

design and operation of Higgins continuous contactor, 10: 1292

development of continuous countercurrent contactors, 10: 2326

isotope separation by, theory, 10: 1864(J)

self diffusion of ions in, measurement by radioactive tracer methods, 10: 2674(J)

**Ion pair production**energy for, from  $\text{S}^{36}$  in air, 10: 2840(J)

particle energy loss, theory, 10: 1595(J)

work function for, in polyatomic gases for  $\text{Po } \alpha$  particles, 10: 1856(J)**Ion pumps**

electromagnetic, for gases at low pressures, 10: 3076(P)

**Ion sources**

of calutrons, problems and design, 10: 3210

for carbon ions, methods of increasing output, 10: 2478

charge receptacles in calutron, design, 10: 1682(P)



## Ion sources (cont'd)

- design, for producing metallic ions, 10: 1663(P), 1664(P), 1665(P), 1667(P)
- design, for use in calutrons, 10: 1678(P), 1685(P)
- design, for use in cyclotrons, 10: 1671(P)
- design, with modified collimating beam, 10: 1668(P)
- design, with modified collimating slot, 10: 1666(P)
- design for mass spectrometers, 10: 2106(J)
- design for multiply charged heavy ion production in linear accelerators, 10: 3046
- design for positive, 10: 2793(J)
- design of Cockcroft-Walton, 10: 1507(R)
- design of indirectly-heated-cathode type, 10: 1679(P)
- mass spectrometer, operation of, 10: 940(J)
- negative ion formation in mass spectrometers, 10: 240(J)
- regulators for, design, 10: 1681(P)
- temperature stabilization in mass-spectrometer, 10: 1456(J)

## Ionium

(See Thorium Isotopes Th<sup>230</sup>)

## Ionization

- cavity, theory, 10: 1472(J)
- by electrons, in mass spectrometers, 10: 2102(J)
- measurements of, along pair paths, 10: 918(J)
- produced by secondary electrons, 10: 442(J)
- of water droplets, balloelectric and electrical field effects, 10: 1415(J)

## Ionization chambers

- bismuth-lined, performance, 10: 2551
- design and calibration, 10: 516(R)
- design and performance for reactor instrumentation, 10: 2467
- design for measuring concentrations of radioactive gases, 10: 3841
- design for neutron detection using fissionable material, 10: 2830(J)
- design of high pressure argon, 10: 1411(R)
- free-air, measurement of field distortion in, 10: 2116(J)
- gas purifier for, 10: 961(J)
- graphite, performance of, in measurements of  $\gamma$  radiation in the Brookhaven Reactor thermal column, 10: 948
- leakage in, design of switches for prevention of, 10: 1669(P)
- line shapes in ungridded, 10: 1411(R)
- neutron sensitivity of CP Meter, 10: 2481
- operation of high-pressure rectangular, 10: 3329(R)
- performance, 10: 3327(R)
- performance, in dosimetry of  $\alpha$  and  $\gamma$  radiation, 10: 2113(J)
- pocket dosimeters, effect of body back scatter on performance, 10: 252
- segmented, determination of  $\gamma$  beam centers by, 10: 971(J)
- use of, for the radiometric analysis of man, 10: 258(J)

## Ionization potentials

- determination of, for N<sub>2</sub>, 10: 999(J)

## Ions

(See also headings for ions by name, e.g. Nitrogen ions.)

- adsorption by water drop, determination, 10: 1843(J)
- electron-loss to electron-capture cross section ratio for, passing through gases, 10: 320(R)
- motion in fields associated with calutrons, 10: 2473
- plasma excitation spectrum in periodic field of, 10: 914(J)
- self-consistent field computation method, 10: 1492(J)
- single scattering of positive, in a gas, measurement, 10: 1940(J)

## Iowa State Coll., Ames

- progress reports on organo-metallic and organo-metalloidal high-temperature lubricants and related materials, 10: 575(R)
- progress reports on organo uranium compounds, 10: 3508(R), 3509(R)

## Iridium

- chromatographic separation and colorimetric determination, 10: 622(J)
- neutron resonances, 10: 2141(J), 3650(R)

## Iridium isotopes

- gamma yields from Coulomb excitation, 10: 3144(R)

Iridium isotopes Ir<sup>191</sup>

- isomers and partial decay scheme, 10: 1022(J)

Iridium isotopes Ir<sup>192</sup>

- decay scheme, 10: 1953(J)
- decay properties, and  $\gamma$  radiation following, 10: 2203(J)
- gamma reactions ( $\gamma$ , p), 10: 569(R)
- gamma spectra, 10: 468(J)

## Iron

(See also Steel.)

- blood plasma levels of, for beagle dogs, 10: 1160(R)
- bremsstrahlung from Li<sup>8</sup> electrons absorbed in, calculations, 10: 3404
- chemical determination in B, 10: 3421
- colorimetric determination, effect of Pu concentration on, 10: 2299
- colorimetric determination in compounds of Be, Ce, and Th, 10: 3429
- colorimetric determination in Hg, 10: 2297
- corrosion by I<sub>2</sub>-benzene solutions, 10: 2707(J)
- corrosion by water at 240 to 360°C, measurement by H evaluation, 10: 2030
- corrosion inhibition by perhenates, 10: 2710(J)
- corrosion inhibition by pertechnetates, 10: 2709(J)
- cosmic showers in, cloud chamber study of, 10: 2762(J)
- determination, organic reagents for, 10: 2997
- gamma albedo from, 10: 1507(R)
- gamma rays excited by inelastic scattering of 3.7-Mev neutrons in, 10: 3034(R)
- gamma reactions ( $\gamma$ , pn), 10: 62
- heat transfer and corrosion tests on Globeiron, 10: 2054
- inelastic neutron scattering,  $\gamma$  rays excited by, 10: 432(J)
- ion exchange separation from plant waste solutions, 10: 3491
- lattice spacings of solid solutions in, formed by elements from Ti to Ni, 10: 2087(J)
- $\mu$ -meson scattering distribution, 10: 1482(J)
- metabolism in man, tracer study, 10: 3165(R)
- neutron-capture  $\gamma$ -ray spectrum, 10: 2174(J)
- neutron-capture  $\gamma$  spectrum, 10: 3655
- neutron elastic scattering cross sections, 10: 1088
- neutron reactions (n,p) at 14 Mev, cross sections, 10: 338(J)
- neutron scattering at small angles by, theoretical interpretation of, 10: 3144(R)
- neutron total cross sections, comparison of measured and calculated values, 10: 2146
- oxidation with V<sup>+4</sup> and solvent extraction of, 10: 705(R)
- photoneutrons produced in, energy and angular distributions of, 10: 1899(J)
- physico-chemical conditions of diffusion film forming on surfaces of, 10: 794(J)
- plant uptake of, from various soil types, tracer study, 10: 555
- potentiometric determination in acid leach solutions, 10: 2998
- production from smelting of Idaho ilmenites, 10: 1808
- proton scattering, 10: 3329(R)

- Iron (cont'd)
- proton scattering by, polarization, 10: 2912(J)
  - protons elastically scattered from, polarization of, 10: 1593(J)
  - shielding properties, and neutron and  $\gamma$  attenuation in Fe,  $B_4C$ , and borated  $H_2O$  systems, 10: 3742
  - solvent extraction of, from carnotite leach solutions, 10: 708(R), 710(R)
  - solvent extraction of, from plateau ores, 10: 712(R)
  - solvent extraction of, from uranium leach solutions, 10: 707(R), 711(R)
  - solvent extraction of  $Fe^{3+}$  from  $H_2SO_4$  solutions with DDAS in benzene, 10: 721
  - spectrophotometric determination in Ca, 10: 609
  - spectrophotometric determination in HCP Process solutions, 10: 3533
  - spectrophotometric determination in Th, 10: 2303
  - thermal diffusivity measurements for Armco, 10: 3367(R)
  - thermoelectric properties, radiation effects, 10: 2497(R)
  - volumetric determination in  $UF_4$  samples, 10: 3512
- Iron alloys
- (See also specific iron alloys e.g. Aluminum-iron alloys;  
Aluminum-chromium-iron alloys.)
  - physico-chemical conditions of diffusing film forming on surfaces of, 10: 794(J)
  - preparation and thermal properties of heat resisting, 10: 1397
  - vacuum and pressure melting, 10: 1833(J)
- Iron-aluminum alloys
- corrosion by Dowtherm A-alkylbenzene mixtures, 10: 3005
  - hardness, temperature dependence of, constitution diagrams, 10: 2090(J)
- Iron-aluminum-chromium alloys
- effect of adding Pt, Pa, Nb, Mo, Ta, W, on oxidation resistance and tensile properties, 10: 834
- Iron-aluminum compacts
- extrusion, 10: 3613
- Iron-aluminum-titanium alloys
- phase studies, 10: 172
- Iron-boron-chromium-nickel systems
- reactor safety rods of, stability, and mechanical and magnetic properties, 10: 1552
  - tensile and impact test results on irradiated, 10: 1823
- Iron bromides
- antiferromagnetic structures, 10: 3144(R)
- Iron-chromium alloys
- corrosion by Dowtherm A-alkylbenzene mixtures, 10: 3005
  - impact properties of vacuum melted, 10: 1833(J)
  - scaling, effect of Cr additions on, 10: 2078
- Iron-chromium-manganese alloys
- rupture, tensile, and thermal shock properties, 10: 826(R)
- Iron(II) fluorides
- entropy and heat capacity, 10: 1265(J)
- Iron(II) hydroxides
- thermal decomposition at temperatures up to  $316^\circ C$ , 10: 3103
- Iron(III) hydroxides
- aging of precipitates, 10: 2009(J)
- Iron(II) ions
- electroreduction, kinetics and reaction mechanism, 10: 2628
  - radioinduced oxidation, 10: 515(R)
- Iron(III) ions
- reduction by  $U^{4+}$  in aqueous solutions, 10: 1770(J)
  - solvent extraction in acidic sulfate with DDAS in benzene, 10: 721
- Iron-iron oxide systems
- electrode potentials in  $Li_2SO_4 - K_2SO_4$  (fused) systems, 10: 580(R)
- Iron isotopes  $Fe^{54}$
- gamma reactions, 10: 571(R)
  - gamma reactions ( $\gamma$ , pn), 10: 569(R)
  - proton reaction (p, $\gamma$ ) cross sections, 10: 402(J)
- Iron isotopes  $Fe^{56}$
- gamma angular correlation and energy levels, 10: 478(J)
  - inelastic scattering of neutrons, time-of-flight measurements, 10: 437(J)
- Iron isotopes  $Fe^{57}$
- excited states, 10: 1609(J)
  - gamma reactions, 10: 571(R)
- Iron isotopes  $Fe^{58}$
- decay scheme, 10: 474(J)
  - neutron scattering cross section, 10: 3034(R)
  - radiometric determination in the presence of  $Co^{60}$ , coincidence technique, 10: 1473(J)
- Iron-nickel alloys
- fabrication of films, 10: 2752(R)
  - films, magnetic properties, 10: 2788(R)
  - films, magnetic properties of H-annealed, 10: 2751(R)
- Iron oxide-iron systems
- electrode potentials in  $Li_2SO_4 - K_2SO_4$  (fused) systems, 10: 580(R)
- Iron oxide-lanthanum oxide systems
- compound formation in, effect of alkali impurities on, 10: 1752(R)
- Iron oxides
- thermal expansion, 10: 3824
- Iron(III) oxides
- flocculation and streaming potentials in aqueous systems, 10: 53
  - solubility in HCl, effects of proton irradiation on, 10: 655(J)
- Iron powders
- sintering, effects on properties, 10: 3017(J)
- Iron-silicon systems
- corrosion by hydriodic acid, 10: 3594
- Iron(II) sulfates
- cathode-ray oxidation of, absolute determination, 10: 2654(J)
  - radioinduced oxidation in  $D_2O - H_2SO_4$  solutions, 10: 3338
- Iron(III) sulfates
- reaction with  $HCOOH$  in aqueous solution,  $\gamma$ -induced, 10: 1273(J)
- Iron-titanium-vanadium alloys
- phase studies, 10: 172
- Iron-uranium alloys
- uranium recovery, 10: 3495
- Iron-water systems
- gamma attenuation, 10: 2508
- Iron-zirconium alloys
- corrosion, effect of microstructure on, 10: 858(R)
  - corrosion in hot  $H_2O$ , effect of microstructure on, 10: 859(R)
- ISHR
- (See Intermediate Scale Homogeneous Reactor.)
- Isomeric transition
- chemical dissociation effects, 10: 3654(R)
  - energy and life time for W, Lu, Er, Ho, Nd, Pr, 10: 3367(R)
  - of short periods, measurement, 10: 473(J)

**Isotope production reactors**

design summary of Argonne, 10: 374

**Isotope separation methods**

convection diffusion, applications and apparatus, 10: 2799(J)

development of ionic centrifuge, 10: 3624

electromigration on paper, 10: 939(J)

equilibrium between two states, negative results, 10: 2797

fluid-flow separation, apparatus for, 10: 3297(J)

ion exchange, theory, 10: 1864(J)

photochemical factors in separation of  $U^{235}$  and  $U^{238}$ , 10: 2471

**Isotopes**

(See also specific isotopes.)

in agriculture, 10: 3169

chemical separation from isotope collectors in electromagnetic process, 10: 1293

electromagnetic separation, 10: 2474

neutron reactions ( $n,\gamma$ ), table of cross sections for, 10: 3658

neutron reactions ( $n,p$ ) and ( $n,\alpha$ ) in Al, Y, Fe, and Mg, 10: 3659(R)

neutron resonance scattering in light, 10: 2496

partition functions of, statistical mechanics, 10: 2111(J)

separation by electromigration on paper, 10: 939(J)

statistical mechanics of mixtures of, 10: 936(J)

**Isovaleric acid,  $\alpha$ -amino**

(See Valine.)

**J****Jet engine fuels**

corrosive effects, cleaning, and thermal properties, 10: 892(R)

**Jets**

(See also Liquid jets.)

performance, in the transfer of solutions, 10: 3585

**Joe Davis Hill Quadrangle (Colo.)**

exploration, geology and mineralogy, 10: 156(J)

**Johannesburg (Calif.)**

geophysical exploration, 10: 1784

**K****K particles**

decay, three-body, 10: 983(J)

decay modes and masses, producing single charged secondary, 10: 2854(J)

disintegration in cloud chambers and emulsions, 10: 301(J)

energy distribution of, produced by proton bombardment, 10: 282(J)

lifetimes of  $\mu$  and  $\pi$ , 10: 3222(R)

long-lived, experiment to determine existence, 10: 1506(R)

mass determinations in emulsion stacks, 10: 283(J)

masses of positive, 10: 3222(R)

mean lifetime and differential energy spectrum of  $K^0$ , corrected data, 10: 2128(J)

production, 10: 3854

production by bombardment of Ta with 4.8-Bev protons, 10: 3848

production of negative, from ( $\pi,p$ ) collision, 10: 289(J)

scattering and interactions in nuclear emulsions, 10: 3329(R)

**Kaibab Limestone (Utah)**

geology, 10: 1784(R)

**Kaiporowits Plateau Area (Utah)**

geophysical exploration and geology, 10: 797

**Kaolins**

turbulent flow of suspensions, 10: 1334(J)

**KAPL Intermediate Power Breeder Critical Experiments**

breeding blanket fissions in PPA-11, 10: 3723

**Kentucky. Univ., Lexington. Kentucky Research Foundation**

progress reports on Ti and Ti alloy scaling, 10: 823(R)

**Kerosene-butyl phosphate systems**

analysis for butyl phosphates by dielectric constant measurements, 10: 3436

**Ketones**

(See also Diketones.)

enolization, tritium isotope effects in, 10: 1903(R)

**Keyenta Formation (Utah)**

geology, 10: 1784(R)

**Kidneys**

clearance of radioliodine by, effects of hormones in rats, 10: 1204(J)

excretion of injected  $Co^{60}$  by, in dogs, 10: 1205(J)

radiosensitivity effects in rats, 10: 3787

shielding, effects on radiosensitivity in rats, 10: 1699(J), 1700(J)

shielding, effects on survival of x irradiated rats, 10: 3787

**Kilns**

(See also Furnaces; Ovens.)

design for conversion of aluminum nitrate and zirconium and aluminum fluorides to their oxides, 10: 3143(R)

**Kings River Valley (Nev.)**

uranium mineralization in Moonlight Mine in, 10: 1355

**Knob Creek Monazite Placer (N.C.)**

exploration, geology, mineralogy, and U occurrence, 10: 1357

**Knolls Atomic Power Lab., Schenectady, N. Y.**

progress reports in nuclear physics, 10: 2494(R), 2495(R)

**Krypton**

determination of atmospheric, procedures for, 10: 3657

luminescence produced by a strong shock front in, 10: 484

melting point and vapor pressure, 10: 3828(J)

radiometric determination in dissolver off-gas, 10: 3324

stripping of singly charged A ions by, 10: 1568(J)

**Krypton ions**

scattering in gas stripping, 10: 1943(J)

**Krypton isotopes**

hyperfine spectra analysis, 10: 1617(J)

**Krypton isotopes  $Kr^{85}$** 

deuteron reactions ( $d,p$ ), energy, 10: 343(J)

**Krypton isotopes  $Kr^{88}$** 

beta emission,  $Rb^{88}$  ions resulting from, 10: 3656

**L****La Veta Pass Area (Colo.)**

geophysical exploration and geology, 10: 801

**Laboratories**

(See also Caves.)



- Laboratories (cont'd)**  
 design, for handling radioactive material, 10: 2024  
 design of university radiochemistry, 10: 646(J)  
 General Motors radioisotope, 10: 207(J)  
 radioactive inhalation, at Rochester Univ., 10: 1776
- Laboratory design conferences**  
 held in Washington, D. C. Sept. 29 and 30, 1955, 10: 2024
- Laboratory equipment**  
 (See also Decontamination of equipment; Remote-control equipment; Servomechanisms.)  
 adjusting and measuring instrument, development, 10: 3060(P)  
 design, for handling radioactive material, 10: 2024  
 designs for hot lab use, 10: 644  
 hot-cell design for reactor fuel fabrication, 10: 3110  
 induction heaters, inductance tables for single-layer, 10: 3826  
 instruments, a guide to the literature, 10: 2787  
 remote-control apparatus for transferring fluids, design, 10: 1655(P)  
 remote-control equipment list, 10: 2323
- Laboratory furniture**  
 (See also Dry boxes.)  
 contamination, relationship to air activity, 10: 1994  
 hoods, design of, for use in hot and cold laboratories, 10: 1651(P)  
 hot cell, design of space-saving, 10: 96(J)  
 shielded box for work at the curie level, 10: 95(J)
- Lakota Formation (S. Dak.)**  
 mineralogy and U distribution, 10: 1789(J)  
 uranium occurrence, 10: 1789(J)
- Laminar flow**  
 (See Fluid flow (laminar); Gas flow (laminar).)
- Laminates**  
 preparation and properties of high strength, 10: 584  
 preparation and properties of high-strength Epon, 10: 585
- Lanthanum**  
 (See also Rare earths.)  
 allotropic forms, transition temperatures, and lattice constants, 10: 569(R)  
 colorimetric determination, 10: 625(J)  
 determination, 10: 3433  
 hyperfine structure of spectra, 10: 2877(J)  
 preparation by potassium reduction of  $\text{LaBr}_3$  on  $\text{LaCl}_3$ , 10: 2979  
 separation of  $\text{Ac}^{227}$  from, by ion exchange, 10: 108(J)  
 surface properties, determination of, 10: 3788(R)  
 surface tension on refractory oxides, 10: 1774(R)  
 toxicity of, and effects of ascites tumors on response to, in mice, tracer study, 10: 552(J)
- Lanthanum chlorides**  
 color centers and luminescence in  $\text{EuCl}_2$ -added, 10: 3104  
 color centers and phosphorescence in, 10: 1729(R)
- Lanthanum hydrides**  
 crystal structure, 10: 2034(J)
- Lanthanum-hydrogen systems**  
 phase studies, 10: 2033(J)
- Lanthanum isotopes  $\text{La}^{138}$**   
 radioactivity, 10: 1601
- Lanthanum isotopes  $\text{La}^{139}$**   
 neutron cross sections at 120 ev and 345 ev, 10: 3656
- Lanthanum isotopes  $\text{La}^{140}$  (cont'd)**  
 nuclear quadrupole moment, 10: 2877(J)
- Lanthanum isotopes  $\text{La}^{140}$**   
 beta- $\alpha$  directional correlations, 10: 3367(R)  
 decay scheme, 10: 466(J)  
 decay scheme analysis, 10: 1107(J)  
 gamma emission, 10: 3650(R)  
 radioactivity, 10: 3659(R)
- Lanthanum-neodymium alloys**  
 phase studies, 10: 569(R)
- Lanthanum oxide-iron oxide systems**  
 compound formation in, effect of alkali impurities on, 10: 1752(R)
- Lanthanum oxide-titanium oxide systems**  
 preparation and crystal structure of a Perovskite-type phase, 10: 1753(J)
- Lanthanum oxides**  
 (See also Iron oxide-lanthanum oxide systems.)  
 crystal lattice dimensions, 10: 3745(R)
- Lanthanum oxyfluorides**  
 lattice energy, calculation, 10: 2768(J)
- Larvae**  
 of *Trichinella*, uptake of C by, tracer study, 10: 557(J)
- Lattices**  
 (See Graphite crystals.)
- Leached zone material**  
 (See Florida leached zone material.)
- Leaching**  
 (See also Uranium leach solutions.)  
 efficiency of carbonate, 10: 1299  
 testing procedures, 10: 2984
- Lead**  
 attenuation of 275- to 525-kv x radiation in, 10: 1960(J)  
 corrosion, 10: 687(R)  
 cosmic showers in, cloud chamber study of, 10: 2762(J)  
 creep, engineering application of absolute rate theory to, 10: 1380  
 elastic scattering of  $\gamma$  rays in, cross sections for, 10: 2916(J)  
 electrochemical properties, 10: 3500  
 electron and positron transmission in, 10: 1441(J)  
 electron pair production in, and absolute cross sections for  $\text{Co}^{60}$  and  $\text{Na}^{24}$   $\gamma$  rays, 10: 1911(J)  
 gamma heating of, in MTR, 10: 1043  
 gamma scattering, 10: 2549  
 $\mu$ -meson scattering distribution, 10: 1482(J)  
 $\mu$  mesonic x-ray spectra, 10: 1123(J)  
 neutron and proton cross sections, 10: 1507(R)  
 neutron polarization in elastic scattering, 10: 439(J)  
 neutron scattering, 10: 1508(R)  
 neutron scattering by, angular distribution and polarization, 10: 1901(J)  
 photon elastic scattering cross-section measurement, 10: 434(J)  
 photoneutrons produced in, energy and angular distributions of, 10: 1899(J)  
 protective effects of shielding with, against x radiation injuries in rats, 10: 532(J)  
 solubility of, in  $\text{PbCl}_2$ , 10: 62  
 x-ray spectra of, 10: 1118
- Lead (liquid)**  
 corrosive effects on container materials at 1000°C, 10: 1365

**Lead-bismuth alloys**

electric and thermal conductivities above and below room temperature, 10: 2724

electric and thermal conductivity at elevated temperatures, 10: 181

**Lead bromides**

transport numbers, 10: 569(R)

**Lead-cadmium alloys**

spectrophotometric determination of Cd in, 10: 3441

**Lead chlorides**

crystal growth of, from aqueous solutions, 10: 87(J)

**Lead chlorides (liquid)**

solvent properties of, for Pb, 10: 62

transport numbers, 10: 62

**Lead crystals**

creep, effect of temperature on, 10: 846

x-ray scattering by, temperature variation, 10: 1435(J)

**Lead-indium alloys**

analysis for In, 10: 62

**Lead isotopes**

age distribution ratios of U isotopes and, U analytical errors from, 10: 2712(J)

distribution between solution and crystals of  $K_2CrO_4$ - $PbCrO_4$ - $H_2O$  systems, 10: 76(J)

ratios, geological data on, 10: 2068(J)

**Lead isotopes  $Pb^{204}$** 

energy levels, 10: 1729(R)

**Lead isotopes  $Pb^{206}$** 

packing fraction, rest mass, and gram atomic weight, 10: 3671

proton reactions (p,n), cross sections, error in, 10: 1411(R)

**Lead isotopes  $Pb^{207}$** 

gamma radiation, precision energy measurements, 10: 352(J)

isomeric transition, 10: 473(J)

**Lead isotopes  $Pb^{208}$** 

energy levels, 10: 1411(R), 2938(J)

**Lead isotopes  $Pb^{209}$** 

gamma spectra, 10: 3104

**Lead isotopes  $Pb^{210}$** 

separation from  $Bi^{210}$  and  $Po^{210}$  by ion exchange, 10: 2798(J)

**Lead isotopes  $Pb^{212}$** 

separation from Th in aqueous  $Cl^-$  and  $NO_3^-$  solutions by electrodeposition, 10: 1306(J)

**Lead-lithium alloys**

crystal structure of  $Li_4Pb_3$ , 10: 3137

**Lead-magnesium crystals**

electrical properties, 10: 331(R)

**Lead oxides**

decomposition stress in molten sodium hydroxide, 10: 1406(J)

**Lead poisoning**

therapy, in rats, 10: 1161(R)

**Lead sulfides**

(See also Galenas.)

adsorptive properties and electrochemical studies, 10: 1781(R)

**Leak detectors**

(See also Mass spectrometers.)

for fission products leak, design of He, 10: 2513

for helium, performance of line recorders, 10: 3476

**Leak detectors (cont'd)**

in vacuum systems, design, 10: 3082(P)

**Lectures**

on nuclear engineering, 10: 3721

on pile neutron physics, 10: 3720

**Leptons**

(See also Electrons; Positrons; Neutrinos.)

reactions with nucleons, 10: 1011(J)

**Leukemia**

radioinduced in rats, 10: 3768(J)

**Leukocytes**

concentration by centrifugation, 10: 3767

count, effects on radiosensitivity of mice, 10: 2574

radiosensitivity effects of, injected in mice, 10: 3768(J)

radiosensitivity effects of injected in mice, 10: 3768(J)

**Level indicators**

design for liquefied gas refrigerants, 10: 932(J)

design of remote electronic, 10: 1857

hot-wire liquid, design, 10: 3207

for liquid Na, design, 10: 1775(R)

**Lewis C. Mundy Claim (Colo.)**

mineralogy, 10: 1352

**Lid Tank Facility**

boral analysis, 10: 3325

borated water for, mixing, 10: 3312

**Light**

(See also Infrared radiation; Optical systems; Quantum mechanics; Scintillation detectors; Ultraviolet radiation.)

transmission in atmosphere, 10: 1838

**Light sources**

self-luminous, from  $Sr^{90}$ -excited phosphors, 10: 891

**Light spectra**

(See also Spectrometers; Spectroscopy.)

effects on photoluminescence emission of alkaline iodides activated by thallium, 10: 2946(J)

measurements from electrical discharge in gases, 10: 3370(J)

**Lime**

(See Calcium oxides.)

**Limestone deposits (Colo.)**

occurrence in Gypsum Gap Quadrangle, 10: 154(J)

**Limestone deposits (Idaho)**

occurrence, 10: 151

**Limestone deposits (Wyo.)**

occurrence, 10: 151

**Linear accelerators**

(See also Cockcroft-Walton accelerators.)

bunching section design, 10: 406

cavity-resonator type, history of development, 10: 2185(J)

design and operation of 40-ft section, 10: 2454

design of cavity resonator, for protons from 50 to 150 Mev, 10: 2904

design of electron, 10: 1079

design of 40-ft, 10: 2452

design of 600-Mev, 10: 414(J)

drift tube development, 10: 2453

drift tube length and spacing for 0.3 to 0.6 c velocities, 10: 1582

economic feasibility of 600-Mev, 10: 418(J)

## Linear accelerators (cont'd)

- electron tubes for, 10: 233
- focusing, calculations for proton, 10: 1075
- ion sources, design for multiply charged heavy ion production, 10: 3046
- lens system, fields of, 10: 3657
- oscillator, mathematical analysis of, 10: 1448
- power loss for deuteron, 10: 1586
- proton energy resolution in ORNL Van de Graaff, 10: 3144(R)
- proton injectors, trajectories of protons in, 10: 2903
- radiofrequency and focusing problems in, 10: 414(J)
- tank for, design, 10: 2498
- vacuum section, tests on, 10: 2547
- waveguide resonator design for proton, 10: 1074

## Linoleic acid

- metabolism in rats, 10: 3184

## Lipids

- (See also Fatty acids.)

- paper chromatography, indicators for, 10: 1305(J)

## Lipoproteins

- centrifugation of serum and egg, factors affecting, 10: 1154
- fractions in, influence of developmental stage in chick embryos, 10: 1153
- metabolism in rats, effects of radiation, 10: 3165(R)

## Liquid drop models

- (See Nuclear models (drop).)

## Liquid flow

- (See also Compressible flow; Convection; Gas flow; Incompressible flow; Subsonic flow.)

- heat transfer from parallel rods in axial, 10: 2052

- velocity measurements and study of, in thermal convection harp, 10: 2054

- of water through a tube bank at high Reynolds number, heat transfer rates, 10: 2053

## Liquid fuel reactors

- (See Fluid fuel reactors.)

## Liquid jets

- high-speed, nodule formations on, 10: 2

## Liquid metal cooled reactors

- (See Experimental Breeder Reactor.)

## Liquid Metal Fuel Reactor

- design, 10: 3143(R)
- design, critical mass, and power calculations, 10: 3399
- fuel processing for removal of  $Zr^{90}$ , 10: 2328
- fuel recovery flowsheet, 10: 3345
- fuel solutions, 10: 2518(R)
- neutron economy and critical size calculations, 10: 2519
- neutron leakage through ends, methods of reduction, 10: 2521
- poisoning effect of fission products, 10: 1550
- reactivity change due to xenon burnout, 10: 1548
- temperature coefficient of reactivity, effect of Xe, 10: 1549
- temperature coefficient of reactivity calculations, 10: 2520, 3400

## Liquids

- adsorptive properties for gases, theory, 10: 2785(J)
- "cell" model, and application to  $He^3$ , 10: 2754(J)
- Cherenkov luminescence excited by  $\gamma$  rays, visual measurements, 10: 1945(J)

## Liquids (cont'd)

- level indicator design, 10: 932(J)
- non-volatile, molecular weight determinations, 10: 232
- radiation effects and radical formation in, 10: 441(J)
- scattering of x rays by, theory, 10: 429(J), 430(J)
- separation by pressure permeation through microporous membranes, 10: 209(J)
- Taylor instability at boundary, mathematical analysis, 10: 125
- thermal diffusion in, 10: 1733(J)
- thermal stability, synthesis of organic materials for heat transfer applications, 10: 2054

## Lisbon Valley Area (Utah)

- geophysical exploration, U distribution, 10: 806

## Lithium

- activation analysis for Na, 10: 2630(J)
- brazing alloy applications, 10: 880(J)
- determination by neutron transmission, 10: 2283
- deuteron reactions ( $d,n$ ) in, in preparation of  $Be^7$ , 10: 1452
- ion exchange in concentrated  $LiCl-HCl$  solutions, 10: 2668(J)
- natural abundance ratio of  $Li^6/Li^7$  in, 10: 2795(J)
- neutron resonances, 10: 2141(J)
- photodisintegration, comparison to photodisintegration of deuteron, 10: 1506(R)
- proton resonances ( $p,\gamma$ ) in, 10: 1909(J)
- proton scattering, asymmetries in neutron and proton production, 10: 1939
- solvent extraction and determination of, with dipivaloylmethane, 10: 62
- spectrophotometric determination of small amounts of, in water, 10: 84
- thermal expansion, 10: 3824

## Lithium (liquid)

- corrosive effects on U, 10: 2428
- solvent properties for Ni, 10: 1371

## Lithium-aluminum alloys

- analysis for Li by neutron transmission, 10: 2283

## Lithium-aluminum alloys (liquid)

- reactions with  $H_2O$ , 10: 560

## Lithium borates

- double decomposition in absence of solvents, 10: 596(J)

## Lithium borohydrides

- preparation, 10: 862(R)

## Lithium chloride-aluminum chloride-potassium chloride-sodium chloride systems

- phase studies, 10: 57

## Lithium chloride-potassium chloride systems

- electrochemical properties and purification, 10: 2988

## Lithium chloride-potassium chloride systems (liquid)

- solvent properties for rare earths, analysis, 10: 3786

## Lithium chlorides

- electric conductivity of concentrated aqueous solutions of, at high temperatures, 10: 2620(J)

## Lithium compounds

- reactions with haloorganic compounds, mechanisms, 10: 575(R)

## Lithium fluoride crystals

- lattice parameter changes of irradiated, 10: 3035(R)
- reflection at crystal-splitting planes of, for molecular rays emitted by Hg, 10: 3849(J)

## Lithium fluorides

- phase studies, 10: 638(J)



- Lithium fluorides (cont'd)**  
thermal expansion, 10: 3824
- Lithium hydrides**  
infrared spectra, 10: 2216(J)  
thermal expansion, 10: 3824
- Lithium iodide crystals**  
production of, design of crucible for, 10: 3144(R)
- Lithium iodides**  
preparation, in non-aqueous systems, 10: 58
- Lithium isotopes**  
atomic spectroscopy, isotopic shift in, 10: 2470  
electromagnetic separation, 10: 3026(R)  
separation procedures, 10: 2470
- Lithium isotopes  $\text{Li}^6$**   
abundance in natural Li, 10: 2795(J)  
excited states, study by inelastic proton scattering, 10: 1506(R)  
helium nucleus reactions ( $\text{He}^3, p$ ), and  $\text{Be}^8$  energy levels, 10: 3144(R)  
isotopic abundance, determination by neutron activation, 10: 2796(J)  
neutron cross sections in (n,t) reaction, 10: 2171  
neutrons scattered from, distribution, 10: 320(R)
- Lithium isotopes  $\text{Li}^7$**   
abundance in natural Li, 10: 2795(J)  
energy level in the areas of higher excitation, study of, 10: 342(J)  
energy levels, 10: 2496  
mechanism of  $\text{Li}^7(\gamma, \text{H}^3)\text{He}^4$  reaction, 10: 389(J)  
neutron energy spectrum from  $\text{Li}^7(d, n)\text{Be}^8$  reaction, 10: 314(J)  
neutrons scattered from, distribution, 10: 320(R)  
production, 10: 2470  
proton reaction (p,n), counter ratio and neutron yield, 10: 398(J)  
proton reactions (p, $\alpha$ ), analysis, 10: 1877(J)  
proton reactions (p,n), angular distribution of neutrons, 10: 1574(J)  
proton reactions (p,n), study of neutron groups from, 10: 3656
- Lithium isotopes  $\text{Li}^8$**   
beta decay electrons absorbed in Fe and Mo, calculations of bremsstrahlung from, 10: 3404
- Lithium-lead alloys**  
crystal structure of  $\text{Li}_2\text{Pb}_3$ , 10: 3137
- Lithium-magnesium alloys**  
constitution diagram, crystal structure, phase studies, and measurements on the Bragg reflections, 10: 2081  
x-ray-diffraction analysis and crystal structure, 10: 1383
- Lithium oxides**  
thermodynamic properties from 25 to 2000°K, 10: 1721
- Lithium silicates**  
phase studies, 10: 638(J)
- Lithium sulfates**  
double decomposition in absence of solvents, 10: 596(J)
- Little (Arthur D.) Inc., Cambridge, Mass.**  
progress reports on development of filter materials, 10: 1778(R)
- Little Rockies District (Utah)**  
geology, 10: 800
- Little Rocky Mountains Area (Mont.)**  
geology and geophysical exploration, 10: 802
- LITR**  
(See Materials Testing Reactor Mockup.)
- Liver**  
metabolism in, effects of radiation on, in chickens, 10: 2575  
shielding, effects on radiosensitivity of rats, 10: 3772
- LMFR**  
(See Liquid Metal Fuel Reactor.)
- Loops**  
(See Corrosion loops.)
- Los Alamos Fast Reactor**  
neutron energy distribution in center, 10: 2540
- Los Alamos Plutonium Reactor**  
(See Los Alamos Fast Reactor.)
- Los Animas Arch (Colo.)**  
geophysical exploration and geology, 10: 801
- Low Intensity Training Reactor**  
(See Materials Testing Reactor Mockup.)
- Low temperature physics**  
(See Cryogenics.)
- Lubricants**  
(See also Greases; Lubrication; Oils.)  
analysis for O dissolved in, 10: 3268  
cutting and machining oils for aluminum, 10: 3823(J)  
evaluation of fluoroesters as high-temperature, 10: 2644  
flow properties and viscosity of, theory of, 10: 890  
high-temperature, development and properties, 10: 737(R)  
high-temperatures, literature survey on usefulness of low molecular weight, polynuclear, aromatic compounds as, 10: 1730  
synthesis of polyphenyls as high-temperature, 10: 1333(R)  
thermal properties and oxidation, 10: 892(R)
- Lubrication**  
(See also Lubricants.)  
equipment for testing effectiveness for high speed anti-friction bearings, 10: 1780(R)  
relaxation theory, 10: 890
- Lucky Strike Claim**  
geophysical exploration, geology, 10: 1350
- Ludlow Formation (S. Dak.)**  
geology, 10: 1790(J)
- Luminescence**  
(See also Fluorescence; Phosphorescence; Thermoluminescence.)  
gamma induced, in cyclohexane and benzene mixtures, 10: 1800(J)  
measurement, performance of photomultipliers, 10: 2027(J)  
of zinc sulfide crystals, under various temperatures, 10: 595(J)
- Lungs**  
effects of radioactive barium sulfate dust on, in rats, 10: 1698(J)  
particle retention, measuring apparatus, 10: 1982  
particle retention in rats, tracer studies, 10: 2006  
polonium metabolism administered into, of rats, effects of, 10: 3168  
radiation effects, modifications produced by cortisone, 10: 3166  
radioruthenium deposition in, autoradiographic dosage determinations on, in mice, 10: 1203
- Lutetium isotopes  $\text{Lu}^{175}$**   
energy levels, 10: 2158(J)  
nuclear magnetic and electric quadrupole moments, 10: 1521(J)
- Lutetium isotopes  $\text{Lu}^{177}$**   
decay schemes, 10: 3851(R)  
internal conversion coefficients for the L subshell, 10: 1518

## Lymph

concentration of fatty acids in, effects of heparin on, 10: 3

## Lymph system

radiogold uptake by nodes, in dogs, 10: 1719(J)

## Lymphocytes

radiosensitivity of, in suspensions of, 10: 1701(J)

## M

## McFadden Peak Quadrangle (Ariz.)

map of, radiometric observations of Sierra Anaha Mts. and Cherry Creek to Canyon Creek in, 10: 1353

## McGulre Lode Claim (Colo.)

exploration, 10: 1352

## Madison Square Area, Manhattan District, New York

progress reports, 10: 3751(R)

progress reports on analytical chemistry, 10: 2272(R)

progress reports on analytical procedures, 10: 3419(R)

## Magnesium

bonding, surface treatment for adhesive, 10: 191

electron energy losses in, 10: 1442(J)

gamma activity induced in, by reactor radiation, 10: 3678

preparation of ingots of, for use in  $\text{TiCl}_4$  production, 10: 175

reduction of U and Th compounds by, 10: 3345

separation from other alkaline earth metals by paper chromatography, 10: 1307(J)

spectrophotometric determination of, in sea water, 10: 1241

## Magnesium (liquid)

reactions with  $\text{H}_2\text{O}$ , 10: 560

## Magnesium alloys

(See also specific magnesium alloys, e.g. Aluminum-magnesium alloys; Aluminum-copper-magnesium alloys.)

analysis for Zr, 10: 2633(J)

## Magnesium-aluminum alloys

deformation of polycrystalline, compression and tensile properties, slip, and twins, 10: 2733

electrodeposition, 10: 3603

## Magnesium-aluminum-copper alloys

strength and creep properties of 2024-T3 at elevated temperatures, 10: 2721

## Magnesium-beryllium alloys

electrodeposition, 10: 3603

## Magnesium-germanium crystals

electrical properties, 10: 331(R)

Magnesium isotopes  $\text{Mg}^{24}$ 

excited states, determinations, 10: 1411(R)

Magnesium isotopes  $\text{Mg}^{25}$ 

energy level in the areas of higher excitation, study of, 10: 342(J)

excited states, determinations, 10: 1411(R)

Magnesium isotopes  $\text{Mg}^{27}$ 

decay schemes and gamma spectrum, 10: 3144(R)

## Magnesium-lead crystals

electrical properties, 10: 331(R)

## Magnesium-lithium alloys

constitution diagram, crystal structure, phase studies, and measurements on the Bragg reflections, 10: 2081

x-ray-diffraction analysis and crystal structure, 10: 1383

## Magnesium oxide-aluminum oxide systems

high-temperature properties and applications, 10: 1345(J)

## Magnesium oxide crucibles

containing 10% Mg, for Mg-U alloy melts, 10: 2719

## Magnesium oxide crystals

lattice energies and relation to particle size, 10: 1434(J)

## Magnesium oxide-silicon oxide systems

thermal conductivity measurement, 10: 1342(R)

## Magnesium oxides

high-temperature properties and applications, 10: 1345(J)

thermal conductivity of  $\text{MgO}$ , 10: 3641

## Magnesium-uranium alloys

diffusion, preparation, metallography, and phase studies in a complete study of, 10: 2719

## Magnetic clutches

design, 10: 3588

## Magnetic fields

(See also Electric fields; Electromagnetic fields.)

charged particle trajectories in, 10: 1412

in circulating Hg, 10: 205(J)

diffusion of charged particles across, 10: 2961(J)

eddy currents produced by synchrotron, influence of, 10: 407

effects on cosmic particles, 10: 213(J)

effects on nuclear spin systems, 10: 201

electron motion in, 10: 2479

focusing of monoenergetic charged particle beams with sector-shaped, 10: 2183(J)

ion motion in, associated with calutrons, 10: 2473

measurement by proton resonance, 10: 2466

measuring instruments and techniques, 10: 926

modification for focusing problems in calutrons, shims for, 10: 1684(P)

motion of charged particles in, 10: 1131(J)

plasma instability in, 10: 1853

residual, in synchrotron magnets, 10: 409

second harmonic measurement of, 10: 3835(J)

strength difference measuring, theory and practice, 10: 3829(J)

tables of  $\text{H}_2$  and  $\text{H}_\text{F}$  components, 10: 893

in turbulent plasma from flame gases of burner operated on O and propane, 10: 2771(J)

## Magnetic materials

energy losses of charged particles traversing, 10: 1627(J)

x-ray absorption and emission by, 10: 2956(J)

## Magnetic resonance

(See also Nuclear magnetic resonance.)

proton, theory, 10: 2221(J)

## Magnetic susceptibility

measurement, equipment for, 10: 3479

## Magnetism

reversal by domain rotation, theory, 10: 2752(R)

## Magnetometers

design for measurements to 300 gauss, 10: 1447

**Magnets**

- construction of magnetic fields for calutrons, 10: 3081(P)
- design for calutrons, 10: 926
- electro-, testing of, 10: 2450
- plastics used in fabrication of, 10: 3205
- of proton synchrotrons, supply voltages for, 10: 1077

**Mallinckrodt Chemical Works, St. Louis.**

- progress reports of the Accountability Program, 10: 747(R)

**Mallinckrodt Process**

- colorimetric determination of Cu and Ni retained in uranyl ammonium phosphate precipitates, 10: 3612
- filtration of pitchblende digest slurry, 10: 1290
- pitchblende feed preparation, 10: 3564
- sampling procedures, 10: 748
- sampling techniques for U in, 10: 719
- SF materials accounting, 10: 747(R)
- uranium determination in Ba cake, 10: 3449

**Mammals**

(See also Animals.)

- cells from, radiosensitivity, effects of O concentration, 10: 2585(J)
- effects of radiation on, quantitative biological methods for determining, 10: 15
- malformations experimentally induced in, neurochemical significance of, 10: 1158(J)
- marine, strontium metabolism in, tracer study, 10: 1718(R)
- radiation effects on burros, swine, and sheep, 10: 1169(R)

**Mammoth Mine (Colo.)**

- occurrence in Gateway Quadrangle, 10: 1359(J)

**Man**

- gamma-ray spectrum, 10: 2573(J)
- measurement of total-body radioactivity from, performance of a scintillation detector for, 10: 946
- potassium content in body as a function of weight and age, 10: 2825(J)
- radiometric analysis, design of ionization chamber for, 10: 258(J)
- radiometric analysis for natural and acquired radioactivity, 10: 3327(R)

**Man(standard)**

- natural radioactivity in, 10: 3175

**Manganese**

- electrochemical properties, 10: 3502
- electrolytic recovery from barren leach liquors, 10: 2035
- exchange between oxidation states, 10: 570(R)
- excretion of, in man, tracer study, 10: 1(R)
- ion exchange on resins, effects of cross linkage on, 10: 1304(J)
- lattice spacings of solid solutions, in  $\alpha$  iron, 10: 2087(J)
- neutron-capture  $\gamma$ -ray spectrum, 10: 2174(J)
- neutron scattering resonances, 10: 3650(R)
- neutron total cross sections, 10: 3656
- recovery from waste solutions by ion exchange, 10: 723(R), 724(R)
- slow neutron transmission measurements, resonance parameters, 10: 316(J)
- spectrophotometric determination in Ca, 10: 609

**Manganese-antimony alloys**

- magnetic structure of, neutron-diffraction analysis, 10: 3144(R)

**Manganese bromides**

- antiferromagnetic structures, 10: 3144(R)

**Manganese-carbon-zinc systems**

- magnetic properties, 10: 1411(R)

**Manganese chlorides**

- magnetic structure, 10: 320(R)

**Manganese-chromium-iron alloys**

- rupture, tensile, and thermal shock properties, 10: 826(R)

**Manganese-copper alloys**

- scaling, effect of Mn concentration on, 10: 2078

**Manganese deposits (Wyo.)**

- radioactivity, 10: 148

**Manganese(II) fluorides**

- entropy and heat capacity, 10: 1265(J)

**Manganese isotopes  $Mn^{54}$** 

- inner bremsstrahlung- $\gamma$ -ray directional angular correlation, 10: 320(R)

**Manganese isotopes  $Mn^{55}$** 

- first excited state, properties, 10: 2155(J)
- neutron total cross section, Breit-Wigner fit, 10: 2496
- neutron total cross section, comparison of experimental and theoretical values, 10: 1534(J)

**Manganese isotopes  $Mn^{56}$** 

- gamma emission, 10: 3650(R)

**Manganese-molybdenum steel**

- impact and tensile properties, effects of radiation on, 10: 2073

**Manganese oxides**

- hydrate, linkage of water in, 10: 3263(J)

**Manganese-tellurium systems**

- magnetic properties, 10: 1411(R)

**Manganese-titanium alloys**

- aging characteristics and effects of stress on, 10: 857
- fracture and tensile properties, effect of H embrittlement on, 10: 856
- plastic deformation and tensile properties, 10: 1396

**Manganese-uranium alloys**

- analysis, 10: 2378

**Manometers**

(See also Pressure gages.)

- design for HF storage tank content measurement, 10: 924

**Manuals**

(See Handbooks and manuals.)

**Markers**

- self-luminous, design and performance, 10: 891

**Martensites**

- transformation near absolute zero, kinetics of, 10: 2227

**Mass spectrography**

- automatic development of mass spectra, optimum method for, 10: 1866(J)
- automatic magnetic development, 10: 1867(J)
- dissociation of molecular H and D beams in, 10: 997(J)
- ion retardation, effects of pressure on, 10: 3745(R)
- status of precise, 10: 1457(J)

**Mass spectrometers**

(See also Calutrons; Electromagnetic separation; Ion sources.)

- auxiliaries, design, 10: 3026(R)
- characteristics of the G.E. ion resonance, and use in routine analysis, 10: 1454
- design and construction techniques for thermal emission, 10: 1453
- design and theory of, utilizing cyclotron resonance, 10: 1455



**Mass spectrometers (cont'd)**

- design for rapid analysis of solid materials, 10: 3635
- design for three stage, 10: 2495(R)
- double focusing, improvements and efficiency, review, 10: 2803(J)
- double-focusing apparatus applicable to, 10: 1865(J)
- formation of negative ions in the aperture of the source of, 10: 240(J)
- ion source for time-of-flight, design, 10: 2106(J)
- ion source temperature stabilization in, 10: 1456(J)
- ion sources, operation of, 10: 940(J)
- ionization by monoenergetic electrons in, 10: 2102(J)
- isotopic abundance, determination by, 10: 2494(R)
- low-voltage power supply for, 10: 1688(P)
- maintenance, procedure for instability source location, 10: 3634
- performance in measurements of He isotopes, 10: 2340
- performance of spiral-orbit, 10: 3222(R)
- resolving power, effect of inhomogeneous magnetic fields on, 10: 2802(J)
- vacuum locks for, design of pneumatically operated, 10: 3027
- variable leak for, in gaseous diffusion process, 10: 3203

**Mass transfer**

- between liquids, effect of flow variables on, 10: 1334(J)
- in liquids, gases, and at rotating cylinders, papers on, 10: 1733(J)
- of metals in liquid hydroxides, 10: 3282
- in packed beds, 10: 121(J), 134(J)

**Massachusetts Inst. of Tech., Cambridge.**

- progress reports, 10: 955(R)
- progress reports on echelle spectroscopy, 10: 3309(R)
- progress reports on metal-ceramic interactions, 10: 1341(R)
- progress reports on refractory materials, 10: 1342(R)

**Massachusetts Inst. of Tech., Cambridge. Dept. of Metallurgy.**

- metallurgy progress reports, 10: 1781(R)
- progress reports, 10: 1812(R), 3189(R)
- progress reports on cold working and recrystallization, 10: 184(R)
- progress reports on solid solutions and grain boundaries, 10: 183(R)

**Massachusetts Inst. of Tech., Cambridge. Div. of Industrial Cooperation**

- progress reports on extrusion of Al alloys, 10: 828(R)

**Massachusetts Inst. of Tech., Cambridge. Lab. for Nuclear Science**

- progress reports, 10: 1903(R), 3329(R)
- progress reports on nuclear science, 10: 1506(R)

**Massachusetts Inst. of Tech., Cambridge. Metallurgical Project**

- accident reports of U-Zr alloy explosions, 10: 1766
- progress reports, 10: 836(R), 837(R)

**Masurium**

(See Technetium)

**Materials of construction**

(See Building materials.)

**Materials testing**

(See also Mechanics; Metallurgy.)

- bibliography on non-destructive methods of, 10: 3014
- equipment for bend testing, 10: 3360
- model for mechanical behavior evaluation with creep tests applied to alpha U, 10: 3050
- non-destructive, electromagnetic, 10: 3802(J)
- under combined repeated stresses with superimposed static stresses, 10: 778

**Materials Testing Accelerator targets**

- heat transfer and thermal stresses in flat plates and thin walled cylindrical tubes used for, 10: 3734
- structural damage accompanying sudden loss of vacuum, 10: 3733

**Materials Testing Accelerators (Mark I)**

- radiofrequency field investigations on 1/10 scale cavity, 10: 1584
- sparking, 10: 2459

**Materials Testing Reactor**

- automatic wire scanner for neutron flux measurements, 10: 381
- coolant flow testing, 10: 3825
- control rod worth, theoretical calculation of multiplication factor to determine, 10: 380
- control rod worth estimation, 10: 3825
- coolant flow and pressure distribution tests, 10: 3701
- coolant requirements at reduced power, 10: 3696
- creep and temperature test equipment in, 10: 781
- criticality studies of loading and neutron flux distribution in, 10: 1044
- design, 10: 2524
- design of reactor tank sections, 10: 2528
- economic evaluation of fuel fabrication, loadings, and cycle times, 10: 2891
- estimated  $U^{238}$  in Th slugs, 10: 1144
- experimental facilities, neutron fluxes,  $\gamma$  heating, and process water flow, 10: 2162
- experimental shielding facility, 10: 3892
- film boiling experiments, 10: 3826
- fission product monitoring in coolant streams, methods and equipment, 10: 3147
- flat vertical power distribution calculations, 10: 2893
- flux distribution and weighting functions for 5 x 5 loadings, 10: 1051
- flux distributions, adjoint functions and weighting factors of, for 5 x 6 loading, 10: 1050
- flux perturbations by materials under irradiation, 10: 388(J)
- fuel assembly and operating procedure improvements, 10: 3381
- fuel assembly nondestructive assaying, 10: 378
- fuel consumption rate, determination by  $\gamma$  scanning, 10: 2890
- fuel element fabrication, 10: 3826
- fuel element rupture and film boiling tests, 10: 3856
- fuel elements, gamma emission and heating of spent, 10: 3157
- fuel loading, computer for determining, 10: 2142(R)
- gamma facilities for experimental purposes, 10: 3043
- gamma heat generation in Al and Pb of, 10: 1043
- gamma heating of Al in, and radiation effects on thermocouples in, 10: 2918
- gamma irradiation facility, intensity measurements, 10: 2750
- handbook, design and description, 10: 1928
- hot cell, design of, 10: 379
- integrated fast flux distribution in several experimental facilities of, 10: 1053
- interplate spacing inspection, design of displacement gages for, 10: 3729
- irradiation of Al rabbits in, 10: 1100
- loading and fuel requirements for 2 week cycles, calculation, 10: 1049
- neutron flux and temperature measurements at 40 Mw, 10: 3825
- neutron flux distribution, 10: 1555, 2194
- neutron flux distribution, measured by radiation damage to graphite, 10: 2892
- neutron flux distribution and fuel burnout, 10: 2161

## Materials Testing Reactor (cont'd)

- neutron flux distribution for thermal and fast neutrons, 10: 2449(R)
- neutron flux distribution in horizontal through facility, 10: 3310, 3717
- neutron flux maps of, 10: 377
- neutron flux measurements, activated wire scanner for, 10: 2142(R)
- neutron flux perturbation in VH-3 facility by Cd rabbit, 10: 2142(R)
- nuclear constants for, as a function of fuel and poison content and Al/H<sub>2</sub>O ratio, 10: 1045
- off-gas stream radioanalysis, 10: 3825
- operating manual, 10: 1027
- operating power, coolant pressure differences, and coolant temperature, 10: 1039
- operation in film-boiling region, and heat transfer, coolant flow, and power level studies, 10: 3401
- possible power levels with and without film boiling, 10: 3871
- poisoning by low cross section fission product formation, 10: 2889
- poisoning by Xe, and behavior of Xe concentration after a power reduction, 10: 2886
- post-neutron acceptance manual, 10: 3870
- power levels for various shim rod positions, 10: 1040
- pre-operational acceptance tests, 10: 3870
- radiation-door assembly design, 10: 1087
- radiation levels of neutrons,  $\gamma$  rays, and  $\beta$  rays from, after shutdown, and shielding requirements, 10: 3691
- reactivity, effect of 10% enriched fuel plate in reflector on, 10: 1924
- reactivity, effects of Xe<sup>136</sup> and I<sup>136</sup> on, 10: 3855
- reactivity, methods for calculating large changes, 10: 2166
- reactivity and poison distribution effects, theory, 10: 1038
- reactivity changes due to localized perturbations, 10: 1054
- reactivity changes due to reduction of Al cladding on fuel elements, 10: 1042
- reactivity changes during operation, 10: 1052
- reactivity effect of reducing Al/H<sub>2</sub>O ratio in core of, 10: 1047
- reactivity losses, poisoning, and fuel consumption during operation, calculation, 10: 1037
- reactivity perturbations and neutron flux distribution, 10: 2888
- reactivity perturbations in, due to Cd wrapper on HB-3 plug, 10: 1036
- reactivity potential of shim rods in, 10: 1048
- reflector savings due to H<sub>2</sub>O blanket, 10: 1041
- shielding, thermal stresses in concrete, 10: 2527
- shielding calculations for coffins for vertical hole plug, 10: 1035
- shielding temperatures, 10: 3690
- shielding voids, neutron streaming through, 10: 2559
- shim rod lifetime, 10: 3826
- site construction, progress, 10: 2509(R)
- startup procedures, 10: 3870
- temperatures in bottom thermal shield proposed for, 10: 2558
- thermal flux depression, 10: 3035(R)
- xenon poisoning at various power levels, 10: 3695

## Materials Testing Reactor Mockup

- assembly, 10: 2169
- boiling experiments, and relation of boiling rate to change in reactivity, 10: 1545
- control rod design, 10: 2526
- design, 10: 3730
- experimental facilities, 10: 3687
- fast neutron spectrum, 10: 3860

## Materials Testing Reactor Mockup (cont'd)

- gamma shielding measurements through water, 10: 2560
- hydrodynamic characteristics and heat generation, 10: 2546
- loading, startup, and  $\gamma$  and neutron flux measurements, 10: 3698
- shielding, adequacy, 10: 2525
- shim-safety rods, design, 10: 3688

## Mathematical tables

(See also Mathematics.)

- of Fermi-Dirac functions, 10: 1870(J)
- of magnetic field components, due to single circular current loop, 10: 893

## Mathematics

(See also Biometry; Computers; Constants and conversion factors; Harmonic analysis; Mathematical tables; Perturbation theory; Statistics.)

- approximate solution to the Hill equation, 10: 3028
- bibliography on numerical analysis, 10: 942
- computer starting routines, 10: 1861(J)
- eigenvalue of solids, 10: 1459
- equations for one-dimensional slab and cylindrical multigroup transport codes, derivation of, 10: 3839
- fundamental modes, numerical determination, 10: 3656
- geometrical corrections for anisotropically emitting sources, 10: 3212
- Madelung series, rate of convergence, 10: 1869(J)
- method of matching maxima, 10: 1460(J)
- Moebius inversion of Fourier transforms, 10: 3372
- moments of distribution in neutron flux, 10: 3237
- multiple integrals, technique for choosing integration formula and mesh spacings, 10: 943
- non-linear oscillations, stability in synchrotrons, 10: 1458
- numerical methods, book, 10: 944(J)
- polynomials, method for obtaining complex roots of, of degree less than or equal to 20, 10: 2805
- probability theory and its applications to statistical analysis, 10: 246(J)
- progress report of ORNL panel, 10: 3211(R)
- projects at ORNL and problems using the Oracle, 10: 244(R)
- reactor calculations for three-region, two-group, two-dimensional reactors, Oracle coding, 10: 3317
- solution of two-group diffusion equation, 10: 3649(R)
- trigonometric integrals, evaluation, 10: 243
- two-group diffusion theory of bare reactors, variational principle for, 10: 1055

## Matrices

(See Reactor matrices.)

## Mechanical beneficiation

- Lapointe picker, development, 10: 795

## Mechanics

(See also Materials testing; Quantum mechanics; Stress analysis; Structures.)

- fluid, equations of change in, and transport phenomena, 10: 1733(J)
- of particles with forces between them, 10: 1619
- plane elasticity, closed form solutions to boundary value problems, 10: 941

## Melting

(See also Furnaces.)

- arc, in high vacuum, techniques of, 10: 853
- factors controlling the rate of, 10: 772(J)

- Membranes**  
(See also Films)  
separation of liquid phases by porous, 10: 209(J)
- Mendelevium**  
review of methods used in obtaining, 10: 1314(J)
- Mercurio group**  
colorimetric determination, 10: 3768(J)  
protective effects against radiation injuries in rabbit's ear, 10: 1196(J)  
protective effects of mercaptoethylamine against radiation injuries in rats, 10: 532(J)  
radiation chemistry of aqueous solutions of  $S^{35}$ -labeled cysteamine and cystamine, 10: 1275(J)  
radiosensitivity effects, 10: 3768(J)  
radiosensitivity effects of mercaptoethylamine in rats, 10: 3772
- Mercaptans**  
(See Thiols)
- Mercury**  
analysis for Cr, Fe, and Ni, 10: 2297  
boiling heat transfer of, 10: 3187  
colorimetric determination in air and urine, 10: 3175  
corrosive effects on stainless steel, 10: 2297  
determination, organic reagents for, 10: 2997  
elastic scattering of  $\gamma$  rays in, cross sections for, 10: 2916(J)  
heat transfer characteristics, effect of gas entrainment, 10: 2054  
heat transfer rates to, and pressure drop for cross-wise flow through staggered tube banks, 10: 2054  
heat transfer under turbulent flow, effect of gas entrainment on, 10: 763  
impulse discharge in, from 50 to 110 kev, 10: 226(J)  
magnetic fields in circulating, 10: 205(J)  
neutron-capture  $\gamma$ -ray spectrum and neutron total cross sections, 10: 3656  
neutron scattering cross sections, 10: 3657  
pinch effect in electric discharge in, 10: 2774(J)  
titration of  $Hg^{2+}$ , 10: 571(R)  
vapors, absorption by iodized carbon, 10: 2605(J)
- Mercury alloys**  
distillation, 10: 3493
- Mercury cathodes**  
applications to uranium determination, 10: 3346
- Mercury compounds**  
solubility of  $HgBr_2$ ,  $HgI_2$ , and  $Hg(CN)_2$  in ethylenediamine, and physical-chemical properties, 10: 1222(J)
- Mercury delay lines**  
equipment employing, for measurement of short time intervals, 10: 238(J)
- Mercury iodides**  
conductance, effects of x rays on, 10: 443(J)  
potentiometric titration with K in liquid  $NH_3$ , 10: 591(J)
- Mercury isotopes**  
half life determination for, 10: 3651(R)  
search for  $Hg^{298}$ , 10: 3295  
separation by equilibrium between two states, negative results, 10: 2797
- Mercury isotopes  $Hg^{180}$**   
disintegration, 10: 1958(J)
- Mercury isotopes  $Hg^{184}$**   
disintegration, 10: 1958(J)
- Mercury isotopes  $Hg^{186}$**   
decay schemes, 10: 1956(J)  
disintegration, 10: 1958(J)
- Mercury isotopes  $Hg^{187}$**   
conversion electron correlation of  $Ta^{181}$  and, 10: 1957(J)  
decay schemes, 10: 1956(J)
- Mercury isotopes  $Hg^{189}$**   
isomeric states, production by inelastic neutron scattering, 10: 2190(J)
- Mercury isotopes  $Hg^{202}$**   
internal conversion electrons from, 10: 1411(R)
- Mercury-sodium alloys**  
heat transfer under turbulent flow, effect of gas entrainment on, 10: 763
- Mesaverde Formation (Colo.)**  
geology, 10: 155(J)
- Mesic atoms**  
energy levels, calculation, 10: 208(J)
- Meson cross sections ( $\pi$ )**  
field isotopic invariability, 10: 2852(J)
- Meson decay**  
of heavy unstable fragments, 10: 305(J)  
phase space prediction of, 10: 3846  
study of, with multi-plate cloud chamber, 10: 2127
- Meson scattering cross sections**  
in perturbation theory calculations, 10: 1626(J)
- Meson showers**  
production of, in paraffin and graphite, 10: 218(J)
- Meson total cross sections**  
for 140- to 400-Mev  $\pi^-$  mesons interacting with H, 10: 272(J)
- Mesons**  
(See also Cosmic mesons; K particles)  
charge renormalization in pseudoscalar theory with pseudoscalar coupling, 10: 1962(J)  
coupling theory in problem of bound, 10: 2954(J)  
coupling to nucleons, theory, 10: 496(J)  
decay modes for K, 10: 3222(R)  
decay of heavy, produced by cosmic radiation, 10: 2854(J)  
detection, production by  $\alpha$  particles, and mass, 10: 3663  
disintegration in cloud chambers and emulsions, 10: 301(J)  
emission from star production, 10: 303(J)  
emission in decay of  $H^3$  or  $H^4$  nucleus, 10: 986(J)  
existence of heavy,  $\Theta^\pm$  and  $\tau^\pm$ , 10: 1487(J)  
heavy, evidence for, 10: 3664  
heavy, evidence of the existence and properties, 10: 2856(J)  
heavy unstable, detection and measurement with cloud chamber, 10: 2127  
heavy unstable, review of data on, 10: 2101(J)  
interaction with nucleons at low energies, properties of, 10: 1895(J)  
isotopic spin formalism and classification of heavy fundamental particles, 10: 322(J)  
lectures on, by B. Rossi, 10: 324(J)  
life time measurements, 10: 304(J)  
lifetimes of, relations between, 10: 3216  
mass, determination by grain counting, 10: 2488  
mass determinations for K,  $\mu$ ,  $\pi$ , 10: 979



**Mesons (cont'd)**

- mass measurements, 10: 2499
- mathematical treatment of, Fermi lectures on, 10: 295(J)
- nuclear capture, 10: 299(J)
- photonic decay of heavy, 10: 3854
- photoproduction from hydrogen, 10: 298(J)
- production in high-energy collisions, 10: 296(J)
- production in meson-nucleon collisions, intermediate-coupling theory, 10: 1970(J)
- production in p-p and n-p collisions, 10: 3222(R)
- production of  $\pi$ , and associated  $\Sigma$  particles by nuclear disintegration, 10: 294(J)
- production of heavy, 10: 292(J)
- production of heavy, with hyperons, 10: 291(J)
- scattering by a fixed scatterer, generalization of equations, 10: 436(J)
- scattering matrix formulation in baryon-meson system, 10: 278(J)
- spin and parity of  $\Lambda^0$  and  $\Xi^-$  particles from cascade decay, 10: 290(J)
- theory, quantitative, 10: 1481(J)
- theory, renormalization of, 10: 1893(J)
- track investigations in emulsion chamber, 10: 2849(J)

**Mesons ( $\theta^0$ )**

- decay and absorption, 10: 2132(J)
- production in cosmic radiation, 10: 2096(J)
- spin, and relation to angular distribution of  $\Lambda^0$  and  $\theta^0$  decays, 10: 2136(J)
- spin and  $V^0$  pair decay, correlation, 10: 1965(J)

**Mesons (K)**

- decay of, relationships between different means of, 10: 3143(R)
- decay to  $\pi$ -mesons, 10: 299(J)
- lifetimes of  $\theta$  and  $\tau$ , interpretation of, 10: 3215
- mass differences, 10: 1009(R)
- in nuclear emulsions, evidence for existence of, 10: 286(J)
- observation in cosmic radiation, 10: 985(J)
- observation in nuclear disintegration, 10: 990(J)
- pair production of, in high energy nuclear interaction, 10: 991(J)
- production, 10: 1009(R)
- scattering by protons from 10 to 6000 Mev, tables of data on, 10: 3303
- stars produced by, summary of, 10: 1489(J)

**Mesons ( $K^-$ )**

- capture, with ejection of high-energy electron, 10: 2138(J)
- nuclear capture in emulsion, 10: 2129(J)
- nuclear interaction, 10: 1894(J)

**Mesons ( $K^+$ )**

- lifetime, 10: 1486(J)
- lifetime determinations, 10: 1009(R)
- masses, decay modes, abundances, and energy spectra of, preliminary data, 10: 3305
- scattering calculations and measurements, 10: 1506(R)

**Mesons ( $\Lambda^0$ )**

- decay in cloud chamber, and properties, 10: 2100(J)
- spin, and relation to angular distribution of  $\Lambda^0$  and  $\theta^0$  decays, 10: 2136(J)

**Mesons ( $\mu$ )**

- capture processes for, electrons from, 10: 2133(J)
- Cu and Pb bombardment with, x-ray spectra from, 10: 1123(J)
- decay, polarization of electrons during, 10: 1892(J)
- ionization by relativistic, studied by counter telescope, 10: 2857(J)

**Mesons ( $\mu$ ) (cont'd)**

- ionization in nuclear emulsions, measurement, 10: 268(J)
- scattering by nuclei, effect of nucleon-nucleon correlation on, 10: 1023(J)
- scattering distribution, in Pb and Fe, 10: 1482(J)

**Mesons ( $\mu^-$ )**

- neutron production from nuclear capture of, 10: 1009(R)

**Mesons ( $\mu^+$ )**

- production by nucleon interactions and scattering, 10: 980(J)

**Mesons ( $\pi$ )**

- analysis of absorption reactions, 10: 3032
- binding of, to heavy fragments, 10: 305(J)
- Coulomb interference in proton scattering of, 10: 982(J)
- cross section for scattering by protons, theory based on strong pion-pion interaction model, 10: 284(J)
- double production in nucleon-nucleon collisions, selection rules for, 10: 287(J)
- ionization in nuclear emulsions, measurement, 10: 268(J)
- lifetime estimation, 10: 918(J)
- phase shift analysis of scattering of 187-Mev, on protons, 10: 370(J)
- phase shift calculation in nucleon scattering, 10: 423(J)
- photoproduction, 10: 297(J)
- photoproduction from deuterons, 10: 2852(J)
- production by  $\gamma$  irradiation of deuterium, and  $\pi^-/\pi^+$  ratio, 10: 3854
- production in proton-proton collisions, theory, 10: 361(J)
- production in proton-proton reactions, 10: 333(J)
- proton scattering phase shifts, analysis, 10: 3153
- protons scattered by 1.4-Bev, phenomenological analysis of, 10: 2855(J)
- ratio of positive and negative, produced by cosmic neutrons in lead, 10: 277(J)
- scattering by H at 165 Mev, cross sections and phase shift analysis, 10: 280(J)
- scattering by nucleons, calculations in Tamm-Dancoff theory, 10: 2232(J)
- scattering by nucleons, dispersion relations, 10: 2230(J)
- scattering by nucleons, semiphenomenological theory of, 10: 2848(J)
- scattering by nucleons in intermediate coupling, 10: 2134(J)
- scattering by protons, phase shifts for, 10: 981(J)
- scattering by protons, use of dispersion relations in analyzing data, 10: 435(J)

**Mesons ( $\pi^-$ )**

- capture by U, Bi, and W, ratio of probabilities of fission and star formation from, 10: 275(J)
- decay product of  $\Lambda^0$ -deuterons, phenomenological study of, 10: 372(J)
- deuteron capture reactions, branching ratio, 10: 2131(J)
- $\pi^-$  interaction with Be, C, O, energy dependence of total cross section, 10: 274(J)
- production of  $K^-$  from interaction of, with protons, 10: 289(J)

**Mesons ( $\pi^0$ )**

- formation from (n,n) and (n,p) reactions in H and D by 400-Mev neutrons, 10: 276(J)
- interaction of, with nucleons, 10: 273(J)
- isotopic invariability of, 10: 2851(J)
- parity, 10: 2131(J)
- photoproduction from deuterons, 10: 273(J)
- production in p-p reactions, 10: 1009(R)

**Mesons ( $\pi^+$ )**

- photoproduction, from H and D, 10: 1903(R)
- scattering by H at 169 Mev, cross sections and phase shift analysis, 10: 281(J)

- Mesons ( $\pi^+$ )**  
total cross sections of H for, at 150 to 750 Mev, 10: 362(J)
- Mesons ( $\tau$ )**  
decay, analysis of, 10: 2853(J)  
decay products, angular and energy distributions, 10: 1903(R)  
decay with low-energy  $\pi^-$  meson, 10: 293(J)  
lifetime determination, 10: 1009(R)  
mass and decay energy, 10: 279(J)  
mass and spin-parity of, 10: 3304  
mean life, 10: 285(J)  
spin and parity, mathematical analyses, 10: 2850(J)  
spin determination, 10: 3329(R)
- Mesons ( $\tau^+$ )**  
disintegrations in nuclear emulsions exposed to  $K^+$  beam, 10: 3847  
lifetime, 10: 1486(J)  
spin, parity, and decay properties, 10: 2135(J)
- Mesons ( $\chi$ )**  
decay, 10: 987(J)  
decay and mass, 10: 302(J)
- Mesons ( $V^0$ )**  
pair decay and  $\theta^0$  meson spin correlations, 10: 1965(J)
- Metaautunites**  
crystallography, 10: 2066
- Metabolism**  
(See also Plant metabolism.)  
of acetate, glucose, fructose, and glycine in mice with a hereditary obesity-diabetes syndrome, tracer studies, 10: 3104  
effects of whole-body irradiation on, in rats and mice, 10: 536(R)  
of formate, glycine, and adenine by chick embryos, effects of  $\gamma$  irradiation on, tracer study, 10: 1182(J)  
intratracheal injection of soluble polonium salts into rats, 10: 3168  
in liver, effects of radiation on, 10: 2575  
in microorganisms, tracer studies, 10: 1168(R)  
of nucleic acids, effects of radiation, 10: 3165(R)  
of sulfates, effects of radiation in mice and rats, tracer study, 10: 1183(J)
- Metaboric acids**  
crystal lattice dimensions, 10: 3745(R)
- Metal borides**  
(See Borides.)
- Metal carbides**  
(See Carbides.)
- Metal chelates**  
(See Chelates.)
- Metal compacts**  
intermetallic diffusion, measurement and effects of radiation on, 10: 2445
- Metal complexes**  
molecular orbitals, 10: 570(R)
- Metal crystals**  
(See also Alkali metal halide crystals.)  
irradiated, effects on x-ray diffraction, 10: 1975
- Metal-foil detectors**  
calibration of Au shield badges, 10: 2812
- Metal-gas systems**  
phase studies of the metal- $H_2$  systems, statistical mechanical approach, 10: 1320
- Metal halides**  
(See also Alkali metal halides.)  
absorption spectra, 10: 1494(J)  
reduction by a hydrogen glow discharge, 10: 1816  
thermal decomposition, apparatus for, 10: 1662(P)
- Metal Hydrides, Inc., Beverly, Mass.**  
progress reports, 10: 2255(R)
- Metal powders**  
sintering with compacted Au-Ag mixtures, behavior, 10: 196(J)
- Metallic films**  
iron-nickel, fabrication techniques, 10: 2752(R)  
spectrographic analysis by x-ray emission, 10: 1402(J)
- Metallurgical Advisory Committee on Titanium**  
progress reports on Ti research and development, 10: 179(R)
- Metallurgy**  
(See also Powder metallurgy.)  
problems in design of nuclear reactors, 10: 1931(J)  
vacuum heat-treating techniques, 10: 1833(J)  
vacuum melting, economics, 10: 1833(J)  
vacuum technology and applications to, 10: 1833(J)
- Metallurgy conferences**  
on Be production, 10: 2446  
on thorium, notes from Metallurgy Development Advisory Committee, AEC, on, 10: 855
- Metals**  
(See also specific metals.)  
adsorption of organic compounds from aqueous solutions by, 10: 109  
arc melting in high vacuum, 10: 1833(J)  
corrosion and oxidation at low and medium temperatures, theory, 10: 2060(J)  
corrosion by TiN, 10: 2251(R)  
corrosion in Zr process solutions, 10: 3278  
corrosive effects of fused NaOH on, 10: 3282  
creep testing equipment for, in MTR, 10: 781  
determination, organic reagents for, 10: 2997  
distillation of amalgams, 10: 3493  
electrodecontamination of, 10: 839  
exchange interactions of electrons in transition, 10: 1433(J)  
fatigue, thermal aspects, 10: 2739(J)  
flame spectrophotometric determination of trace quantities in Diesel fuels, 10: 1248(J)  
galling of surfaces in sliding contact, thermal aspects, 10: 1840  
grain size determination by ultrasonic methods, 10: 854  
high-temperature reactions with water, importance in reactor operation, 10: 1034  
hydridation, theory, 10: 1728(R)  
inclusion removal, design and performance of ultrasonic "jack-hammer," 10: 3357  
interaction between, and atmospheres during sintering, 10: 2743(J)  
metallurgical aspects of, book, 10: 877(J)  
order-disorder in, x-ray studies, 10: 843  
physical properties, radiation effects on, determination, 10: 3322  
properties, effect of irradiation, 10: 1410(J)  
proton stopping power of, at 20 Mev, 10: 1092(J)  
purification by thermal decomposition of salts, 10: 1662(P)

## Metals (cont'd)

- purification by zone melting, theory, 10: 3193
- quantitative determination, masking agents for, 10: 3108
- rare, genesis of granite pegmatites containing, 10: 810(J)
- sintering mechanisms, 10: 1829(J)
- surface-barrier analysis, 10: 1400(J)
- surface diffusion coefficients of, 10: 889(R)
- surfaces, electron microscope techniques for observation of, 10: 3208(J)
- thermal conductivity measurement, 10: 181
- thickness measurements of,  $\gamma$  gage for, 10: 143(J)
- twinning, elastic and inelastic, 10: 868(J)
- vacuum distillation of non-ferrous, 10: 1833(J)
- vacuum melting, status of, 10: 1830(J)
- vapor pressure determinations, 10: 1833(J)
- x-ray absorption and emission by ferromagnetic, 10: 2956(J)

## Metals (liquid)

- coordination numbers, 10: 872(J)
- electromagnetic pumps, design, 10: 3061(P)
- interfacial tension and spreading studies, and importance in reactor technology, 10: 1063(J)
- reactions of Zr, Al, stainless steel, and mild steel with  $H_2O$  under high pressure, 10: 847
- thermal diffusion, 10: 2089(J)
- specific heat, measurements and theory, 10: 2054
- viscosity measurements, instrumentation, 10: 780

## Metamict minerals

- conversion of zircon into metamict state, 10: 3131(J)

## Metamorphic deposits (Ariz.)

- occurrence in Dripping Spring Quartzite Formation, 10: 1353

## Metanovacekites

- crystallography, 10: 2066

## Metatorbernites

- crystallography, 10: 2066
- genesis and occurrence in Eureka Gulch Area (Colo.), 10: 1363(J)

## Metatyuyamunites

- crystallography, 10: 2066

## Metazeunerites

- crystallography, 10: 2066

## Meteorites

- method of neutron activation analysis, 10: 3853(R)
- neutron activation analysis for U content, 10: 992(J)

## Meteorological instruments

- airborne filter sampler and gustiness analyzer, design, 10: 1(R)
- design, 10: 3327(R)

## Meters

(See Calorimeters; Dilatometers; Extensometers; Flowmeters; Goniometers; Manometers.)

## Methacrylic acid

- polymerization, x-ray-induced, 10: 1284(J)

## Methane

- electron energy levels and mass spectra of, 10: 885
- mass spectrum and energy levels of fragment ions and radicals, 10: 995
- synthesis of deuterium-labeled, 10: 630(J)

## Methane, fluoro-

- synthesis of deuterium-labeled, 10: 630(J)

## Methane, tetrafluoro-

(See Carbon tetrachloride.)

## Methane, trichloro-

(See Chloroform.)

## Methanoic acid

(See Formic acid.)

## Methanol

- heat transfer under turbulent flow, 10: 763
- reactions of d-labeled-, with organometallic compounds, isotope effect in, 10: 1224(J)

## Methanol-benzene systems

- thermodynamic properties, 10: 1334(J)

## Methanol-methyl borate systems

- phase studies, 10: 60

## Methanol-water systems

- scattering of x rays by, 10: 1096(J)

## Methionine

- biosynthesis in bacteria, 10: 1161(R)
- biosynthesis of, from homocysteine and methylmethionine sulfonium salt, by A. aerogenes, 10: 740(J)

## Methyl borate

- physical properties, 10: 60
- preparation, 10: 3498

## Methyl borate-ethane, dimethoxy-systems

- phase studies, 10: 60

## Methyl borate-methanol systems

- phase studies, 10: 60

## Methyl borate-petroleum systems

- phase studies, 10: 60

## Mexico (Baja California)

- petrographic examination of radioactive minerals in Department of Santer in, 10: 3808(J)

## Mica

- effect of  $\beta$  radiation on conductivity, 10: 318(R)
- ratio of  $A^{40}$  to  $K^{40}$  in, 10: 937(J)

## Mice

- parasite infestations of laboratory, 10: 3327(R)
- radiation dosage determinations, 10: 1161(R)
- radioinduced genetic and developmental changes, 10: 3768(J)

## Michigan Research Reactor

- transient performance prediction by extrapolation of Borax data, 10: 2900(J)

## Michigan. Univ., Ann Arbor

- progress reports and research programs on nuclear chemistry and radiochemical separations, 10: 1208(R)
- progress reports on biological effects of irradiation, 10: 3787

## Michigan. Univ., Ann Arbor. Engineering Research Inst.

- progress reports on chemistry of boron hydrides and related compounds, 10: 2613(R)

## Microbalances

(See Balances.)

## Microscopes

(See also Electron microscopes.)

- arrangement of, for precise scattering measurements in nuclear emulsions, 10: 959(J)
- metallographic, for use at elevated temperatures, design and performance, 10: 234



- Microscopes (cont'd)**  
stage for high-temperature high-pressure studies, design, 10: 3124
- Microscopy**  
(See also Electron microscopy; Photomicrography.)  
of elastic fibers and sinews, tissue preparation, 10: 1156(J)  
phase-, design of liquid chamber, 10: 1161(R)  
preparation of tissue samples, 10: 2578
- Microwave equipment**  
design and operation of microwave interferometers, 10: 3217
- Microwave oscillators**  
stabilization of klystrons by gas-absorption spectral line, 10: 930(J)
- Microwaves**  
accuracy of frequency standards, 10: 306(J)  
detection and measurement, interferometers for, 10: 3217  
lens opacities in rabbits produced by, 10: 1173(J)
- Midwest Research Inst., Kansas City, Mo.**  
progress reports on MoS<sub>2</sub> lubrication, 10: 303(R)
- Milk**  
formation and extraction, tracer study, 10: 1169(R)  
ion exchange separation of Ca and Sr from, tracer study, 10: 726  
radiation effects, 10: 516(R)
- Mills**  
(See Ball mills.)
- Mine Safety Appliances Co., Callery, Penna.**  
progress reports, 10: 1775(R)  
progress reports on SUR system and components, 10: 120(R)
- Minerals**  
analysis of Th and U concentrations in Indian, 10: 1744(J)  
bibliography of, of interest to metal S&E, 10: 3283  
quantitative mineralogical determination of In, rocks, 10: 2711(J)
- Minnelusa Formation (S. Dak.)**  
uranium occurrence, 10: 1789(J)
- Minnesota Mining and Mfg. Co., St. Paul.**  
progress reports on synthesis of fluorine-containing rubbers, 10: 1750(R)
- Minnesota. Univ., Minneapolis**  
progress reports on U exploration, 10: 3130(R)
- Minnesota. Univ., Minneapolis. University Hospital.**  
progress reports, 10: 2005(R)
- Mites**  
(See Arachnids.)
- Mitosis**  
(See also Chromosomes; Genetics.)  
effects of irradiation on, in grasshopper neuroblasts, 10: 1988(J)
- Mixer-settlers**  
design and performance in amine extraction process, 10: 3186(R)  
design and performance of, for use in small scale pilot plants, 10: 117  
micro-, design, 10: 1271  
operation for Zr-Hf separation, 10: 3794  
theory and operating characteristics, 10: 3587
- Moab Quadrangle (Utah)**  
photogeologic map, 10: 819(J), 1798(J), 1799(J), 1800(J), 1801(J)
- Mocking Bird Claim (Colo.)**  
radioactivity, 10: 1352
- Moderators (reactor)**  
(See Reactor moderators.)
- Moenkopi Formation (Utah)**  
geology and mineralogy, 10: 1784(R)  
geology of, in Dripping Springs Area, 10: 798  
Mohawk No. 7 Prospect (Nev.)  
mineralogy, 10: 1358
- Molecular beams**  
(See also Ion beams.)  
condensation of Na<sup>24</sup>, on metals, 10: 3657  
production, apparatus for, 10: 2496  
use in study of rotational spectra of molecules, 10: 1120(J)
- Molecular properties**  
states of adsorbed molecules, transition probabilities for, 10: 1490  
vibrational frequencies in isotopic molecules, calculations, 10: 1119(J)
- Molecular structure**  
intermediate structures in metathetic reactions, 10: 3782(J), 3783(J)  
of macromolecules, mathematical analysis, 10: 507  
molecular field theory, internal conversion, and nuclear forces, 10: 320(R)  
of water and ZZ<sub>N</sub> molecules, extension of Thomas-Fermi atomic model to 10: 2226
- Molecular weights**  
determination of equivalent and, by potentiometric microtitration in non-aqueous solvent, 10: 1244(J)  
of non-volatile liquids and solids, determinations by means of boiling-point elevation, equipment for, 10: 232
- Molecules**  
anharmonicity and the frequencies of isotopic, relationship between, 10: 3306(J)  
macro-, sorption and orientation properties of, 10: 507  
resonance emission and the fluorescence of atomic and diatomic, polarization theory of, 10: 1898(J)  
states of adsorbed, transition probabilities for, 10: 1490
- Molybdenum**  
arc-cast, fabrication and welding, 10: 176  
bremsstrahlung from Li<sup>8</sup> electrons absorbed in, calculations, 10: 3404  
chemical determination in B, 10: 3421  
chemical state in basic solution, 10: 2625(R)  
coating techniques, 10: 865  
colorimetric determination, 10: 570(R)  
colorimetric determination in Mo-U alloys, 10: 3444  
fluorination for preparation of MoF<sub>4</sub>, 10: 1817  
metal spraying, oxidation-resistant coating for, 10: 863  
oxidation-resistant coatings for, development of, 10: 827  
oxidation-resistant coatings for, metal spraying, 10: 2083  
physical and metallurgical properties, 10: 2434  
plastic deformation, 10: 1813  
plastic deformation and tensile properties, 10: 1396  
removal from uranium leach solutions, 10: 3117  
separation from technetium by ion exchange, 10: 3792  
solid state purification, by induction heating, 10: 1833(J)  
solvent extraction of, from U leach solutions, 10: 711(R)  
stress-strain data on, from -196 to 1540°C, 10: 192  
uranium adsorption and cyclic column testing of Vitro leach liquor, effects of, 10: 2983
- Molybdenum-beryllium alloys**  
crystal structure of MoBe<sub>12</sub>, 10: 1851(J)

**Molybdenum carbonyls**

infrared spectra and thermodynamic properties, 10: 2213(J)

**Molybdenum-chromium alloys**

cermets of, with  $Al_2O_3$ , fabrication, testing, and properties, 10: 1783(J)

**Molybdenum-chromium-titanium alloys**

preparation, mechanical properties, heat treatment, and microstructure, 10: 1394(R)

**Molybdenum fluorides**

thermodynamic properties, 10: 635(R), 2019(R)

**Molybdenum(VI) fluorides**

preparation by fluorination of Mo, 10: 1817

**Molybdenum isotopes**

electromagnetic separation, 10: 3026(R)

gamma yields from Coulomb excitation, 10: 3144(R)

**Molybdenum isotopes  $Mo^{96}$** 

nuclear moments, 10: 2156(J)

**Molybdenum isotopes  $Mo^{97}$** 

nuclear moments, 10: 2156(J)

**Molybdenum isotopes  $Mo^{100}$** 

radioactivity, 10: 1601

**Molybdenum isotopes  $Mo^{106}$** 

decay properties, 10: 2881(J)

**Molybdenum-manganese steel**

impact and tensile properties, effects of radiation on, 10: 2073

**Molybdenum-niobium-uranium alloys**

spectrophotometric analysis for uranium, 10: 1233

**Molybdenum oxychlorides**

preparation and thermodynamic properties of gaseous, 10: 583

**Molybdenum silicide coatings**

for graphite, properties and application of, 10: 1268

**Molybdenum sulfides**

lubricity, nature of friction forces in, 10: 203(R)

**Molybdenum-tin-zirconium alloys**

mechanical properties, effect of heat treatment on, preparation, 10: 833

**Molybdenum-titanium alloys**

ductility, preparation, microstructure, and welding, 10: 176

transformation kinetics, effect of  $O_2$  content on, 10: 867

**Molybdenum-uranium alloys**

analysis for Mo, 10: 3444

casting and melting, 10: 2568

electrical resistance, hardness, and microstructure, 10: 1368

hardness, effect of heat treatment on, casting, and density, 10: 3610

heat treatment, 10: 3601

phase diagram, microstructure, and strength of heat-treated, 10: 2444

spectrophotometric analysis for uranium, 10: 1233

thermal conductivity, 10: 3616

transformation kinetics, 10: 1368

ultrasonic inspection of cast and wrought, 10: 2084

**Molybdenum-uranium alloys (liquid)**

reactions with  $H_2O$ , 10: 560

**Molybdenum-zirconium alloys**

analysis, heat treatment, and crystal structure, 10: 1370(R)

surface properties of, studied with a field emission microscope, 10: 852

**Monazite deposits (N.C.)**

occurrence in Cleveland and Lincoln Cos., 10: 804

**Monazite deposits (N.C.) (cont'd)**

occurrence in Cleveland Co., 10: 1357

occurrence in First Broad River Area, 10: 805

**Monazites**

(See also Thorium ores; Uranium ores.)

colorimetric determination of U in, 10: 111(J)

distribution of, along Visakhapatnam (India) coast, 10: 1788(J)

processing for U and Th recovery, 10: 3788(R)

production of Th from, by acid leaching, 10: 568(R)

rare earth distribution in, 10: 811(J)

**Monkeys**

effects of mild doses of radiation administered over a long period of time, on behavior and physiology in, 10: 520(J)

effects of whole-body x irradiation on blood picture in, 10: 530(J)

radiation effects on behavior, 10: 1166

**Monongahela Formation (Penna.)**

geology and coal deposits in, 10: 152

**Montana**

geophysical exploration of Little Rocky Mountains Area in Blaine and Phillips counties, 10: 802

**Montana (Broadwater Co.)**

exploration of Canyon Ferry Quadrangle in, 10: 153

**Monte Carlo method**

(See also Mathematics; Statistics.)

statistical analysis, 10: 3652(R)

**Montmorillonites**

adsorptive properties for fission products, 10: 2327

adsorptive properties for Sr and Cs, 10: 2039(J)

**Moonlight Mine (Nev.)**

geology, U occurrence, mineralogy, and exploration, 10: 3007

uranium mineralization, exploration, 10: 1355

**Morphine**

radiosensitivity effects in mice, 10: 1705(J)

**Morrison Formation**

petrographical investigations of the Salt Wash Member of the, 10: 149(R)

**Morrison Formation (Colo.)**

geology, 10: 154(J), 156(J), 157(J), 158(J), 159(J)

**Morrison Formation (N. Mex.)**

occurrence of U deposits in Brushy Basin Member and Westwater Canyon Member, 10: 799

stratigraphy, 10: 2063

**Morrison Formation (Utah)**

occurrence of radioactive deposits, 10: 797

**Mossback Member (Utah)**

of Chinle Formation, uranium mineralization and ore deposits, 10: 800

**Motors**

(See also Laboratory equipment.)

design, for application in rotating pumps, 10: 3588

**Mound Lab., Miamisburg, Ohio**

progress reports, 10: 668(R)

progress reports in electronics, 10: 3622

progress reports on biological research, 10: 546(R)

waste disposal program in 1948, 10: 116

**MTR**

(See Materials Testing Reactor.)

**Mullites**

properties and industrial applications, 10: 1346(J)

**Multiplication factor**

derivation of, 10: 2563

determination of thermal utilization factor, 10: 3869

determination of thermal utilization factor in Brookhaven graphite pile, 10: 3866

measuring techniques and correlation with theory, 10: 1554

theoretical calculation to determine control rod worth, 10: 380

**Mutations**

in plants and animals, radioinduced, 10: 3169

radiation-induced, 10: 3143(R)

radioinduced, 10: 2590(J)

radioinduced, in *Drosophila*, 10: 33(J), 3095

radioinduced in *Paramecium*, effects of  $H_2O_2$ , 10: 1986(J)

radioinduced in plants and *Drosophila*, 10: 1(R)

radioinduced in yeast, 10: 3165(R)

symposium, 10: 3093

**N****National Bureau of Standards, Washington, D. C.**

progress reports on alloying theory, 10: 3361

progress reports on metallurgy studies, 10: 3603

progress reports on separation of Zr from Hf, 10: 3494(R)

progress reports on the electrodeposition of Tl, 10: 862(R)

**Navajo Sandstone (Utah)**

geology, 10: 1784(R)

**Naval Ordnance Lab., Corona, Calif.**

progress reports, 10: 2768(R)

progress reports on computer components, 10: 2752(R)

progress reports on computing machine program, 10: 2751(R)

**Naval reactors**

(See also Submarine Intermediate Reactor.)

shielding for thermal neutrons, design and construction, 10: 3083(P)

**Naval Research Lab., Washington, D. C.**

progress reports on nuclear science and technology, 10: 1507(R)

**Nebraska (Dawes Co.)**

geology and mineralogy of Brule and Chadron Formation in, 10: 3192

**Neck**

displacement of the oesophagus by an abnormal subclavian artery, 10: 1978(J)

**Negatrons**

(See Beta particles.)

**Neodymium**

(See also Rare earths.)

allotropic forms, transition temperatures, and lattice constants, 10: 569(R)

**Neodymium hydrides**

crystal structure, 10: 2034(J)

**Neodymium-hydrogen systems**

phase studies, 10: 2033(J)

**Neodymium-lanthanum alloys**

phase studies, 10: 569(R)

**Neodymium oxides**

crystal lattice dimensions, 10: 3745(R)

**Neon**

high frequency discharge in, probe methods for investigation, 10: 2773(J)

neutron scattering cross sections, 10: 3144(R)

neutron scattering from, 0.8 to 1.7 Mev, 10: 320(R)

stripping of singly charged A ions by, 10: 1568(J)

**Neon ions**

scattering in gas stripping, 10: 1943(J)

**Neon isotopes**

separation by convection diffusion, 10: 2799(J)

separation of  $Ne^{21}$  from, by thermal diffusion, 10: 2800(J)

**Neon isotopes  $Ne^{20}$** 

energies, spins, and parities of excited states, predicted by  $\alpha$ -particle model, 10: 2951(J)

energy levels, 10: 3329(R)

energy levels, study by inelastic proton scattering, 10: 1506(R)

**Neon isotopes  $Ne^{21}$** 

separation from natural Ne by thermal diffusion, 10: 2800(J)

**Neon isotopes  $Ne^{22}$** 

beta disintegration, 10: 1959(J)

**Nephrosis**

glycoproteinuria associated with, 10: 2636(J)

**Neptunium**

(See also Actinides.)

adsorption from 1M  $HClO_4$  on Dowex-50 resins at 25°C, 10: 1764(J)

determination, in pitchblende, 10: 2468

determination in fission products, 10: 1230

electrodeposition from acid solutions, 10: 3275

**Neptunium compounds**

chemical properties, 10: 3416

**Neptunium(VI) fluorides**

Infrared spectra, 10: 1313(J)

**Neptunium ions**

thermodynamic properties, 10: 2256(R)

**Neptunium isotopes  $Np^{237}$** 

alpha emission and spheroidal shape, 10: 3144(R)

measurement of the 59.75-keV  $\gamma$  from, 10: 1411(R)

thermal neutron activation cross section of, 10: 2142(R)

**Neptunium isotopes  $Np^{239}$** 

decay properties, new  $\gamma$  rays in, 10: 2205(J)

decay schemes, 10: 1729(R)

**Nervous system**

(See also Brain.)

cerebellar response to acute x irradiation in cats, 10: 1179(J)

**Neutrinos**

angular correlation with electrons in neutron  $\beta$  decay, 10: 1500(J)

contribution to the earth's heat by, from sun, 10: 3654(R)

emission from  $A^{21}$ , spectrum of recoil ions from, 10: 2159(J)

experiment to detect inverse neutron decay induced by, 10: 319

mass, and reaction  $He^3(n,p)H^3$ , 10: 3650(R)

recoil spectrometer for, and decay of  $A^{21}$ , 10: 1513(J)

**Neutron absorption cross sections**

(See Neutron capture cross sections.)



## Neutron activation cross sections

- Cd-ratio measurements for 26 elements, 10: 3654(R)
- measurement for various substances, 10: 3656
- measurement with Sb-Be photoneutrons, 10: 3649(R)

## Neutron beams

- collimation, design of apparatus for, 10: 3656
- collimation and determination of intensity, 10: 2454

## Neutron capture cross sections

- analysis for 82 neutron isotopes, 10: 3651(R)
- calculation on Oracle, 10: 3211(R)
- fabrication of B<sub>4</sub>C-S filters for measurement, 10: 1411(R)
- of fission products, 10: 3890
- measurement, for C, Mg, Al, and La, 10: 3651(R)
- ratio of fission product, to U<sup>235</sup> fission cross section, 10: 1058
- for Na and Cr by Co and Mn detection, 10: 3654(R)
- tables, 10: 3653(R)

## Neutron cross sections

- determination of, for Xe<sup>135</sup>, 10: 1013
- effects of crystal structure on, 10: 3652(R)
- measurement for Mn below 5 kev, 10: 3649(R)
- measurements in polythene and graphite at 60 to 550 kev, 10: 1596(J)
- nomogram for calculation of, for reactions with fission neutrons, 10: 1007(J)
- scattering and total, for Bi, Ta, In, Fe, and S, 10: 1507(R)
- temperature effect on effective, 10: 1496
- for various elements, summary of data on, 10: 3657
- for various elements at 115 and 300 ev, 10: 3655

## Neutron fission cross sections

(See also Capture-to-fission ratios.)

- of uranium isotopes U<sup>234</sup> and U<sup>238</sup>, to 4.0 Mev, 10: 1650(J)

## Neutron resonance cross sections

- determination, equations for, 10: 3653(R)
- measurements for Co<sup>60</sup>, Mn<sup>56</sup>, W<sup>187</sup>, method and results of, 10: 3654(R)
- tables, 10: 3653(R)

## Neutron scattering cross sections

- calculations for nuclear surface deformation, 10: 1501(J)
- determination for Bi, Ta, In, Fe, and S, for 14-Mev neutrons, 10: 1088
- determination for 17.9-Mev neutrons, 10: 433(J)
- measurement, for nonelastic fast neutron scattering, 10: 317(J)
- measurements, for crystalline material, 10: 3651(R)
- theoretical and experimental considerations, 10: 3652(R)

## Neutron shielding

- efficiencies of docosane, boron hydrides, B, and other elements for, 10: 2492
- flux distribution in nonhydrogenous multilayer, 10: 1497

## Neutron sources

(See also Reactor thermal columns; Water boiler neutron sources.)

- application in soil moisture measurements, 10: 2845(J)
- calibration of Ra-Be, 10: 3649(R)
- design and calibration, 10: 957
- neutron self absorption in RaCO<sub>3</sub> surrounded by Be, 10: 3644
- performance of d-d, 10: 1003
- preparation and properties, 10: 3378
- production of Ra-Be, 10: 2490
- pulsed, fast and thermal neutron diffusion from, 10: 1005(J)

## Neutron sources (cont'd)

- radium-beryllium, calibration, 10: 2483
- thermal, calibration by biological means, 10: 1(R)
- use of V<sup>51</sup>(p,n)Cr<sup>51</sup> reaction as 5- to 120-kev, 10: 399(J)

## Neutron spectra

- Breit-Wigner resonance over Maxwellian, average, 10: 2495(R)
- measurement in a thermal pile, 10: 947

## Neutron spectrometers

- collimator, shielding, and drive mechanism developments for MTR crystal, 10: 3825
- crystal, description and performance, 10: 2843(J)
- design, 10: 1507(R)
- design and use of neutron chopper for transmission measurements, 10: 316(J)
- design for time-of-flight fast neutron counting, 10: 962(J)
- design of fast, using stilbene scintillators, 10: 2119(J)
- development of recoil type, 10: 1837(R)
- fast description of, 10: 1571(J)
- fast neutron chopper, design, 10: 3653(R)
- operation of fast chopper, 10: 3655
- with scintillation counters, 10: 1503(J)
- test results on Nevis Velocity, 10: 3852(R)

## Neutron spectroscopy

- apparatus and techniques for energy spectra in the 2.0 to 10 Mev range, 10: 3159
- proportional counter using He<sup>3</sup>, 10: 965(J)
- short neutron burst production for, 10: 3221
- time-of-flight, development of millimicrosecond, 10: 3144(R)

## Neutron total cross sections

- comparison of measured and calculated values, 10: 2146
- energy dependence of, in energy range from 380 to 630 Mev., 10: 3036(J)
- measurement, by Co and Mn resonance scattering analysis, 10: 3653(R)
- measurement with Bi ionization chambers, 10: 2551
- measuring equipment refinements, 10: 1837(R)
- tables, 10: 3653(R)

## Neutrons

(See also Cosmic neutrons; Delayed neutrons; Fast neutrons; Neutron beams; Neutron sources; Photoneutrons; Resonance neutrons; Thermal neutrons.)

- absorption, methods of calculating and application to reactor shielding, 10: 2187
- absorption and scattering, 10: 3329(R)
- absorption by boron carbides, 10: 1599
- absorption in D<sub>2</sub>O, 10: 3142
- absorption of epithermal, effect on calculated age, theoretical calculations, 10: 3314(R)
- age in Be-H<sub>2</sub>O systems, 10: 2139
- angular and energy distribution, from C, Al, Ni, Ag, Au, proton bombardment, 10: 3222(R)
- angular correlation in the  $\beta$  decay, 10: 1411(R)
- angular distribution and polarization of 3.4-Mev, scattered by Pb and Bi, 10: 1901(J)
- angular distribution from plane surfaces, and loss in reactor matrices, 10: 3643
- angular distribution of, elastically scattered by F, 10: 3144(R)
- angular distribution of, in the Li<sup>7</sup>(p,n)Be<sup>7</sup> reaction, 10: 1574(J)
- angular distribution of groups from Na, Al, and P deuteron bombardment, 10: 1570(J)

## Neutrons (cont'd)

angular distribution of scattered, apparatus for measurement, 10: 1837(R)

attenuation, effect of moderator temperature, 10: 1498

attenuation, multigroup and age theory approximations, 10: 1505(J)

attenuation and diffusion processes in matter, 10: 1504(J)

attenuation and diffusion of thermal and fast, in  $D_2O$ , 10: 3379(R)

attenuation and fission factors for, in  $U^{238} - H_2O$  fuel assemblies, 10: 2884

attenuation due to elastic collisions, and energy distribution, 10: 2864(J)

attenuation in concrete, theoretical determination, 10: 1086

attenuation in nonhydrogenous multilayer shields, 10: 1497

behavior in a cavity, fundamental equations describing, 10: 3642

beta decay, electron-neutrino angular correlation, 10: 1500(J)

biological effects, and detection and measurement, 10: 957

collimation experiments, 10: 3144(R)

collimation of monoenergetic, 10: 2496

cross sections for H-moderated assemblies, 10: 3220

detection, design of  $BF_3$  counter for, 10: 3658

detection, design of high-threshold scintillation detector for, 10: 2818(J)

detection and measurement, by reactions in Al, P, and I, 10: 3646

detection and measurement, calibration of equipment, 10: 3034(R)

detection and measurement, design of proportional fission counters for, 10: 3638

detection and measurement, high-resolution crystal spectrometer for, 10: 2843(J)

detection and measurement from MTR mockup, 10: 3698

detection and measurement in nuclear reactors, 10: 1683(P)

detection and measurement of, performance of ionization chambers for, 10: 516(R)

detection and measurement with anthracene crystals, 10: 951

detection and measurement with Bi ionization chambers, 10: 2551

detection by  $\beta$  emission from capture in  $Rh^{103}$ , 10: 2834(J)

detection with  $BF_3$ -filled proportional counters, 10: 3299

detectors, geometry, 10: 2485

diffusion, treatment of geometrically thin regions within two-space dimension multigroup difference equation framework, 10: 1002

diffusion equation, rates of convergence in numerical solution, 10: 1028

diffusion in reactors, effect of air channels on, 10: 1064(J)

diffusion in space lattice of fissionable and absorbing media, 10: 2491

diffusion length in exponential piles, 10: 1033

distribution, derivation of equations for, in nuclear reactors, 10: 2898(J)

distributions around air slots in  $H_2O$ , 10: 3397

Doppler effect in capture of, 10: 3654(R)

dosage determinations, 10: 43(R)

dose buildup factor in  $H_2O$ , 10: 3645

dosimetry, 10: 3327(R)

dosimetry, influence of scattering, 10: 2816

elastic scattering of 80-kev, as test of "complex potential" model, 10: 428(J)

energy distribution, in Los Alamos Fast Reactor, 10: 2540

energy measurement, by recoil proton determinations, 10: 3746

energy spectra in water, 10: 3377

energy spectrum and angular distribution, from  $N^{14}(d,n)O^{16}$  reaction, 10: 2862(J)

energy spectrum of, from  $Li^7(d,n)Be^8$  reaction, 10: 314(J)

flux and cross sections in reactor calculations, 10: 1065(J)

flux calibration, by weighing Hg in irradiated Au, 10: 3650(R)

## Neutrons (cont'd)

flux in infinite H moderator, calculations of, 10: 1000

flux measurement calibration by means of  $O^{18}(p,n)F^{18}$  reaction, 10: 1506(R)

gamma spectra from capture by V, Co, Ti, Fe, Cr, Au, Mn, and I, 10: 2174(J)

inelastic scattering,  $\gamma$  rays excited by, 10: 432(J)

inelastic scattering by rotational excitation, 10: 1902(J)

interaction with nuclei at low energies, theory of, 10: 1499(J)

leakage in bare critical reactors, 10: 376

mass difference relative to protons, 10: 1506(R)

measurement of pulsed flux in the presence of pulsed x rays, 10: 1871

migration areas of fission, in  $U-H_2O$  lattices, 10: 3869

multigroup methods of solving age-diffusion equation, programming of IBM 650 for, 10: 2804

nuclear reactions (n,d), contribution of deuteron stripping to collision matrix, 10: 393(J)

nuclear reactions produced by, and production in D-D and D-T reactions, 10: 1508(R)

phonon scattering of, in aluminum crystals, 10: 1006(J)

polarization, 10: 3650(R)

polarization, paramagnetic effects, 10: 3652

polarization by reflection from magnetized Co mirrors, 10: 3654(R)

polarization from elastic scattering of, from  $Li^7$ , 10: 3144(R)

polarization in elastic scattering by nuclei, 10: 439(J)

potential of neutron-proton system and deuteron photodisintegration, 10: 1966(J)

production, high voltage generator for, 10: 1502(J)

production from  $\mu$ -meson capture, 10: 1009(R)

production in D-T reaction, cross section and line shape, 10: 2173

production in quasi-elastic exchange collisions, theory, 10: 3878

production method for mono-energetic, 10: 1003

production of monoenergetic, 10: 1900(J)

production of short burst of, 10: 3221

prompt fission, angular correlation measurements, 10: 1004(J)

proton-neutron scattering cross sections, 10: 321(J)

proton scattering, theory and experiments, 10: 3663

reactions with electrons, possibility of electrical, 10: 2493

reflection, influence of thermal motion and molecular distribution on, 10: 2496

reflection by semi-infinite isotropic scattering absorbing medium, 10: 2544(R)

reflection coefficients estimated using concept of removal cross sections, 10: 3218

reflection from ferromagnetic mirrors, 10: 3655

resonance absorption, using flat and resonance scattering detectors, 10: 3655

resonance absorption by U, effect of temperature on, 10: 3647

resonance absorption in lumps and mixtures containing U, 10: 3758

resonance absorption of, geometrical effects, 10: 3219

resonance capture, measurements of total radiation widths, 10: 2141(J)

scattering, angular distribution of n-p, 10: 320(R)

scattering, by  $\alpha$  particles, theoretical study of phase shifts in, 10: 2952(J)

scattering, coherent n-p, 10: 3656

scattering, energy distribution in the 2.0- to 10-Mev range, 10: 3159

scattering, in U, 10: 2569

scattering, integral equation for monochromatic, 10: 3654(R)

scattering, target thickness effects, 10: 3852(R)

## Neutrons (cont'd)

- scattering at 14 Mev, cloudy crystal ball model for, 10: 2955(J)
- scattering at small angles by intermediate and heavy nuclei, 10: 2140(J)
- scattering by V, correlation with Debye model, 10: 1852(J)
- scattering from nuclear surface deformations, 10: 1501(J)
- scattering measurements, 10: 2454
- scattering of 90-Mev, measurement with proportional counters in coincidence, 10: 2551
- scattering of polarized, by  $\text{He}^4$ , and spin-orbital splitting of  $\text{He}^6$  levels, 10: 2869(J)
- scattering of 17.9-Mev, angular distribution of protons, 10: 433(J)
- scintillation detection and measurement, 10: 1837(R)
- self absorption in  $\text{RaCO}_3$  surrounded by Be, 10: 3644
- self-shielding of a plane absorbing foil, 10: 3850
- slowing down, 10: 3721
- slowing down, lecture notes on theory, 10: 2564
- slowing down and diffusion in finite media, 10: 422(J)
- slowing-down effects in Al and graphite, 10: 2548
- slowing down in reactors, 10: 1001
- slowing down in water, UNIVAC calculations, 10: 313
- small angle scattering, 10: 3649(R)
- small-angle scattering of fast, by heavy nuclei, 10: 2909(J)
- from spontaneous fission of  $\text{Cr}^{252}$ , energy spectrum, 10: 2144(J)
- time-of-flight analyzer for, design, 10: 1(R)
- tissue dosage resulting from  $\text{B}^{10}(\text{n},\alpha)\text{Li}$  reaction, 10: 2968
- transmission through air slot in  $\text{H}_2\text{O}$ , angular distribution, 10: 3376
- transmission through air slots, 10: 3393
- transmission through air slots, effect of multiple offsets on, 10: 3396
- transmission through air slots, effect of source size on, 10: 3879
- transmission through air slots, effects of wall material on, 10: 3868
- transmission through air slots in  $\text{H}_2\text{O}$ , effect of vertical position of single offset on, 10: 3395
- transmission through straight slots in  $\text{H}_2\text{O}$ , 10: 3867
- transport equation, UNIVAC moment calculations, 10: 312
- transport theory, 10: 3237, 3720
- transport theory, harmonic analysis, 10: 2489
- velocity distribution of thermal, effect on flux distribution in U spheres, 10: 3748

## Nevada

- airborne radiometric survey in Nye Co., 10: 1784
- uranium occurrences in Humboldt Co., 10: 3007

## Nevada (Clark Co.)

- uranium occurrence in Goodsprings Mining District in, 10: 1358

## Nevada (Humboldt Co.)

- exploration of Moonlight Mine in, 10: 1355

## New Brunswick Lab., AEC, N. J.

- progress reports, 10: 81(R)

## New Hampshire. Univ., Durham

- progress reports, 10: 3747(R)

## New Mexico (McKinley Co.)

- exploration of Church Rock Area in, 10: 2063
- uranium deposits and color changes in Morrison Formation of Zuni Uplift in, 10: 799

## New York Operations Office. Health and Safety Div., AEC.

- progress reports, 10: 2248(R)

## New York Univ., New York

- progress reports on fluorescence and conductivity phenomena, 10: 251(R)

## Nickel

- colorimetric determination by dimethylglyoxime method, 10: 2280
- colorimetric determination in Hg, 10: 2297
- colorimetric determination in uranyl ammonium phosphate precipitates, 10: 3612
- corrosion by  $\text{HF} - \text{H}_2\text{SO}_4$  solutions of synthetic Hanford waste, 10: 3597
- corrosion by liquid sodium hydroxide, role of sodium oxide, 10: 2057
- corrosion in 500 and 600°F water, 10: 1806
- corrosive effects of fused NaOH on, 10: 2702
- crystal structure, effects of neutron irradiation, 10: 3133
- electrodeposition, 10: 874(J)
- electrodeposition of, plates on Ti and Ti alloys, 10: 193
- electrodeposition on Al and Bi, 10: 3815
- electrodeposition on Zr and Zr alloys, 10: 3358
- electrolytic polishing, 10: 2682
- electron bombardment and displacement of atoms in the lattice, 10: 3307(R)
- gamma reactions ( $\gamma, p$ ), energy and angular distributions from 21.5 to 28.0 Mev, 10: 1069(J)
- gravimetric determination with 4-methyl and 4-isopropyl-1,2-cyclohexanedionedioxime, 10: 1742(J)
- hardness and tensile strength, effects of neutron radiation on, 10: 3677(R)
- ion exchange separation from plant waste solutions, 10: 3491
- lattice spacings of solid solutions, in  $\alpha$  iron, 10: 2087(J)
- neutron reactions ( $n, p$ ) at 14 Mev, cross sections, 10: 338(J)
- oxidation at 400°C, kinetics of, 10: 2085(J)
- preparation, chemical analysis, and fabrication of high-purity, 10: 824
- reactions with molten NaOH from 700 to 900°C, 10: 586
- separation from Co by solvent extraction with  $\text{SCN}^-$ -hexone, 10: 2669(J)
- separation from Ga, 10: 570(R)
- solubility in fused NaOH, 10: 2702
- solubility in molten Li, 10: 1371
- specific heat from 20°C to 600°C, 10: 331(R)
- spectrophotometric determination in Ca, 10: 609
- static potential measurements, 10: 887
- x-ray-absorption spectrum of, from Cu-Ni alloy foils irradiated with neutrons, 10: 1020(J)

## Nickel (liquid)

- surface tension at elevated temperatures, 10: 1341(R)

## Nickel alloys

- (See also specific nickel alloys, e.g. Aluminum-nickel alloys;  
Aluminum-nickel-titanium alloys.)

## brazing of Inconel, 10: 864

## corrosion by hydriodic acid, 10: 3594

corrosion by  $\text{HF} - \text{H}_2\text{SO}_4$  solutions of synthetic Hanford waste, 10: 3597

## corrosion in 500 and 600°F water, 10: 1806

## diffusion of Cr in, 10: 3364(J)

## melting process for higher quality super, 10: 199(J)

## preparation of binary, 10: 824

## Nickel-aluminum alloys

## hardness, temperature dependence of, constitution diagrams, 10: 2090(J)

## preparation, physical properties, fabrication, oxidation, and powder metallurgy of modified NiAl, 10: 1391

## Nickel-aluminum oxide systems

## oxidation, 10: 786

## Nickel-aluminum-titanium alloys

## preparation and properties, 10: 1391



**Nickel-aluminum-zirconium alloys**

preparation and properties, 10: 1391

**Nickel arsenides**

crystal structure, theory, 10: 1432(J)

**Nickel-beryllium alloys**

precipitation hardening of neutron-irradiated, 10: 3035(R)

precipitation-hardening reaction in, effects of neutron irradiation on, 10: 2919(J)

tensile properties, 10: 836(R)

**Nickel-bismuth alloys**

constitution diagram and microstructure, 10: 3815

**Nickel-boron-chromium-iron systems**

reactor safety rods of, stability, and mechanical and magnetic properties, 10: 1552

tensile and impact test results on irradiated, 10: 1823

**Nickel carbonyls**

infrared spectra, 10: 2215(J)

**Nickel-chromium alloys**

corrosion by Dowtherm A-alkylbenzene mixtures, 10: 3005

diffusion studies, 10: 1812(R)

scaling, effect of Cr additions on, 10: 2078

**Nickel-chromium steel**

bainite transformation in, x-ray-diffraction analysis, 10: 850

transformation diagrams, comparison of, 10: 1382

**Nickel coatings**

electrodeposition on U, 10: 2387

fabrication by electrodeposition of "black nickel," 10: 874(J)

**Nickel-copper alloys**

Hall Effect in, 10: 1385

nickel x-ray-absorption spectrum from, irradiated with neutrons, 10: 1020(J)

**Nickel-copper compacts**

diffusion, effects of radiation on, 10: 2554

**Nickel(II) fluorides**

entropy and heat capacity, 10: 1265(J)

**Nickel-gold alloys**

Hall Effect in, 10: 1385

**Nickel hydroxides**

aging of precipitates, 10: 2009(J)

**Nickel ions**

electroreduction of  $\text{Ni}^{2+}$ , kinetics and reaction mechanism, 10: 2628

**Nickel-iron alloys**

fabrication of films, 10: 2752(R)

films, magnetic properties, 10: 2788(R)

films, magnetic properties of H-annealed, 10: 2751(R)

**Nickel isotopes**

purification, 10: 3026(R)

stable, separation and purification, 10: 2336

**Nickel isotopes  $\text{Ni}^{66}$** 

neutron reaction,  $\text{Ni}^{66}(\text{n},\text{p})\text{Co}^{66}$ , 10: 2142(R)

**Nickel isotopes  $\text{Ni}^{68}$** 

energy levels, evidence for existence of 2.158-Mev, 10: 1949(J)

gamma-gamma cascade, directional correlation function of, 10: 1110(J)

proton reaction ( $\text{p},\gamma$ ) cross sections, 10: 402(J)

**Nickel oxides**

gamma spectrum of  $\text{NiO}$ , 10: 2142(R)

**Nickel-uranium alloy-uranium couples**

corrosion current density measurements, 10: 887

**Nickel-uranium alloys**

static potential measurements, 10: 887

**Nigger Hill (Colo.)**

geology, 10: 1363(J)

**Niobium**

corrosion in 500 and 600°F water, 10: 1806

determination, 10: 3433

effects on properties of stainless steel, 10: 1401(J)

etchant for, 10: 830

occurrence in minerals and rocks, 10: 1817

physical and metallurgical properties, 10: 2434

physical properties and gaseous interactions, survey, 10: 3606

preparation by thermal decomposition of  $\text{NbCl}_5$ , 10: 3196(R)

production and industrial uses, 10: 177

radioactivity of fission-product, determination by chromatographic method, 10: 2926

separation from Ta, 10: 3196(R)

solubility in Zn, 10: 3196(R)

solvent extraction from Ta, 10: 2989

**Niobium alloys**

properties, survey, 10: 3606

**Niobium-beryllium alloys**

crystal structure of  $\text{NbBe}_{12}$ , 10: 911(J)

**Niobium carbides**

heats of formation and combustion, 10: 2623(J)

**Niobium fluorides**

purification, 10: 2019(R)

**Niobium isotopes**

carrier-free, separation from mixed fission products, 10: 1288(R)

**Niobium isotopes  $\text{Nb}^{96}$** 

nuclear isomerism, decay scheme, and coefficients of internal conversion electrons, 10: 472(J)

**Niobium minerals**

occurrence, 10: 1817

**Niobium-molybdenum-uranium alloys**

spectrophotometric analysis for uranium, 10: 1233

**Niobium oxides**

crystal structure of  $\text{NbO}_2$ , 10: 1850(J)

**Niobium steel**

corrosion by  $\text{HNO}_3$  and  $\text{HNO}_3$ -HF solutions, 10: 3806

**Niobium-thorium alloys**

phase studies on, 10: 840

**Niobium-titanium alloys**

ultraviolet microscopic investigation, 10: 1408(J)

**Niobium-uranium alloys**

phase studies, 10: 3196(R)

**Niobium-uranium-zirconium alloys**

explosions in pickling and etching, 10: 3615

**Niobium-zirconium alloys**

heat treatment and phase studies, 10: 1370(R)

tensile properties, 10: 1804

**Nitric acid**

corrosive effects on materials for handling fuming, and thermal stability, 10: 1347

## Nitric acid (cont'd)

- corrosive effects on 347 stainless steel, 10: 3596
- corrosive effects on weld deposits, 10: 147
- determination in thorium nitrate solutions, 10: 3431
- determination of  $\text{Cl}^-$  in, 10: 55
- distribution between dibutyl carbitol and aqueous temperature and density effects on, 10: 3481
- gasometric determination in  $\text{N}_2\text{--O}_2$  systems, 10: 3781(J)
- liquid-vapor equilibrium compositions from boiling aqueous solutions of, 10: 55
- recovery and corrosive properties, 10: 3806
- solubility of Pu oxalates and Pu phosphates in, 10: 3504
- solubility of uranyl ammonium phosphate in, 10: 3573
- solvent properties for TTA and  $\text{U}^{6+}$ , 10: 2333
- titrimetric determination in UNH, 10: 2285

## Nitric acid-hydrofluoric acid systems

- corrosive effects on stainless and Nb steels, 10: 3806
- corrosive effects on Zr and stainless steel and solubility in, 10: 3129

## Nitric acid-nitrogen oxide systems

- vapor pressure, 10: 1227(J)

## Nitric acid-2-pentanone, 4-methyl- systems

- phase diagrams, 10: 1817

## Nitric acid-uranyl nitrate-water systems

- phase studies, 10: 1315

## Nitrides

- powder extrusion of high melting point metals, 10: 1407(J)

## Nitrogen

- analysis for  $\text{O}_2$ , 10: 3442
- diffusion in Ti and Ti alloys, 10: 1389
- diffusion in Zr and Sn-Zr alloys, 10: 3195
- dissociation energy, 10: 228
- effects on mechanical properties of Ti and Ti alloys, 10: 1388
- exchange reactions of  $\text{N}^{14}$  and  $\text{N}^{15}$  between  $\text{NH}_4^+$  and  $\text{NH}_4\text{OH}$ , 10: 718
- isotopic exchange between  $\text{NH}_3(\text{g})$  and ammonium carbonate, 10: 2801(J)
- neutron cross sections, 10: 3668
- nuclear magnetic resonance in several compounds, 10: 1126(J)
- reactions with Ca from 300 to 600°C, 10: 588(J)
- volumetric determination in Ca, 10: 609

## Nitrogen-deuterium systems

- refractive index and liquid-vapor equilibrium data, 10: 629

Nitrogen ion beams ( $\text{N}^{14}$ )

- cross section for electron loss in N, 10: 3138(J)

## Nitrogen ions

- excited states of  $\text{N}_2^+$ , 10: 999(J)

## Nitrogen isotopes

- purification, 10: 3026(R)
- separation by convection diffusion, 10: 2799(J)
- separation by flow through a high surface area silica powder pack, 10: 3837

Nitrogen isotopes  $\text{N}^{13}$ 

- chemical state, from  $\text{N}^{14}$  (n,2n) reactions, 10: 93(J)

Nitrogen isotopes  $\text{N}^{14}$ 

- analysis of  $\pi^- + \text{N}^{14}$  reaction, 10: 3032
- decay, 10: 1605(J)
- deuteron reaction (d,n), neutron threshold and cross section measurements, 10: 395(J)

Nitrogen isotopes  $\text{N}^{14}$  (cont'd)

- deuteron reactions (d,n), angular distribution and energy spectrum of neutrons from, 10: 2862(J)
- gamma radiation from  $\text{N}^{14}(\text{d,p}\gamma)\text{N}^{15}$  and  $\text{N}^{14}(\text{d,n}\gamma)\text{O}^{15}$  reactions, 10: 1575(J)
- neutron reactions (n,p), and correlation with  $\text{C}^{14}$  half life, 10: 3650(R)
- nuclear reactions (n,2n), 10: 93(J)
- spectrographic determination, 10: 1128(J)

Nitrogen isotopes  $\text{N}^{15}$ 

- concentration by isotopic exchange of nitrogen in  $\text{NH}_3$  - ammonium carbonate systems, 10: 2801(J)
- production on large scale for nuclear reactors, 10: 1213
- spectrographic analysis, improved methods of, 10: 2225(J)
- spectrographic determination, 10: 1128(J)
- spin-spin doublets, theory, 10: 3656

Nitrogen isotopes  $\text{N}^{16}$ 

- detection and measurement of, in reactor coolants, 10: 385(J)
- energy levels in the  $\text{O}^{18}(\text{d},\alpha)\text{N}^{16}$  reaction, 10: 1538(J)

## Nitrogen oxide-nitric acid systems

- vapor pressure, 10: 1227(J)

## Nitrogen oxides

- absorption in water, 10: 77(J)
- aqueous adsorption from gases, mechanisms, 10: 735
- colorimetric determination, 10: 2287(R)
- gasometric determination in  $\text{N}_2\text{--O}_2$  systems, 10: 3781(J)
- photoionization efficiencies and cross sections in  $\text{N}_2\text{O}$  and  $\text{NO}$ , 10: 998(J)
- reaction with hot Cu in separation from gas mixtures, 10: 3486
- removal from gaseous mixtures, 10: 3292
- solubility in various solvents, 10: 1817

## Nitrogen-oxygen systems

- gasometric analysis for nitrogen oxides and acids, 10: 3781(J)

## Nitrogen-tin-zirconium systems

- kinetics in temperature range of 920 to 1640°C, 10: 3195

## Nitrogen-titanium systems

- plastic deformation and tensile properties, 10: 1396

## Nitrogen-zirconium systems

- kinetics in temperature range of 920 to 1640°C, 10: 3195

## Nitrous acid

- formation by  $\text{NO}_2\text{--HNO}_3$  reactions, 10: 2618(J)
- oxidation of Pu by, 10: 2345

## Noble gases

(See Rare gases.)

## Nomographs

- for corrosion rate calculation, 10: 2708(J)
- of fission-neutron reaction cross sections, 10: 1007(J)
- shielding weight changes evaluated by, 10: 1615(J)

## North American Aviation, Inc., Downey, Calif.

- progress reports of Reactor Physics Div., 10: 2544(R), 3314(R), 3315(R)
- progress reports on general chemistry, 10: 2258(R)
- progress reports on radiation effects, 10: 2497(R), 3405(R), 3479(R), 3738(R)
- progress reports on reactor evaluation, 10: 3313(R), 3853(R), 3874(R)
- progress reports on reactor physics, 10: 3379(R)
- progress reports on solid state and irradiation physics, 10: 3368(R)

## North Carolina

- exploration of Buffalo Creek Placer Deposits in Cleveland and Lincoln counties, 10: 804
- exploration of Knob Creek Monazite Placer in Cleveland Co., 10: 1357
- geology, radiometric reconnaissance, 10: 2064

## North Carolina (Cleveland Co.)

- exploration of First Broad River Area in, 10: 805

## North Carolina Research Reactor

- fuel leak in, 10: 1557
- gamma emission, 10: 2814
- neutron flux measurements, 10: 2896

## North Dakota

- exploration and occurrence of U minerals, 10: 3130(R)

## Növacckites

- crystallography, 10: 2066

## Nozzles

- (See also Rocket motor nozzles.)
- gas flow through, at critical velocity, theoretical analysis, 10: 767(J)

## NRX Reactor

- accident to, 10: 375

## Nuclear aircraft

- (See also Aircraft reactors.)
- instrumentation, operation and instruction manual for control, 10: 1858

## Nuclear batteries

- (See also Photoelectric cells.)
- design and properties of thermocouple, 10: 1839
- designs, advantages, and cost, 10: 931(J)
- development and testing, 10: 318(R)

## Nuclear electric moments

- (See also Nuclear magnetic moments.)
- of cadmium  $\text{Cd}^{111}$ , interaction with electric field of a cubic crystal, 10: 1913(J)
- calculations, 10: 1528(J)
- determination for  $\text{Ho}^{165}$ , 10: 1532(J)
- quadrupole, of odd-A nuclei, explanation for, 10: 1511(J)
- theory, in j-j coupling, 10: 1631(J)

## Nuclear emulsions

- (See also Photographic emulsions; Photographic film detectors.)
- antiproton reactions, 10: 3854
- beta measurement by, temperature effects on, 10: 2482
- blackening by gas discharges in counters, 10: 1470(J)
- bremsstrahlung cross sections and electron energy loss measurements with, 10: 1443(J)
- calibration of NTB-2 plates for  $\beta$  sensitivity, 10: 1475(J)
- cosmic radiation energy spectrum determinations, 10: 214(J)
- disintegration of hyperfragments in, 10: 904(J)
- excitation energy of nuclei in, determination from tracks of recoil nuclei, 10: 1017(J)
- gap density measurements, 10: 271(J)
- ionization measurements along pair paths, 10: 918(J)
- ionization measurements on tracks in, 10: 1887(J)
- $\theta$ -K meson decay in, 10: 286(J)
- K-particle decay modes and masses studied by, 10: 2854(J)
- K-particle disintegration in, 10: 301(J)
- magnetic analysis of particles scattered in, 10: 2117(J)

## Nuclear emulsions (cont'd)

- mesonic decay of  $\text{H}^3$  or  $\text{H}^4$  observed in, 10: 986(J)
- microscope arrangement for precise scattering measurements in, 10: 959(J)
- nuclear capture of hyperon produced in, 10: 984(J)
- particle life time measurement with, 10: 304(J)
- preparation, for use in rocket cosmic ray investigations, 10: 2760(J)
- preparation techniques, 10: 1879(J)
- properties of NTB-2 plates, 10: 1475(J)
- proton,  $\pi$ -meson, and  $\mu$ -meson tracks in, 10: 268(J)
- radioactive inclusions studied by liquid, 10: 2833(J)
- scattering-in corrections for biased samples of particles incident on, 10: 265(J)
- soaking and drying to increase accuracy of observation in, 10: 280(J)
- stars produced by 1000-Mev protons in, characteristics of, 10: 907(J)
- track lengths in, variation with angle of dip, 10: 266(J)

## Nuclear engineering

- lectures on neutron leakage and slowing down in reactors, 10: 3721

## Nuclear induction

- theory, 10: 201

## Nuclear magnetic moments

- (See also Nuclear electric moments.)
- comparison of super multiplet, j-j, and L-S pairings in connection with, 10: 337(J)
- correlation of, based on shell model, 10: 1522(J)
- determination for  $\text{Ho}^{165}$ , 10: 1532(J)
- deviation from Schmidt limits of  $\text{S}_{1/2}$  nuclei, 10: 1905(J)
- effect of weak coupling of nucleons to nuclear surface, 10: 344(J)
- equations for, and application to  $\text{Li}^7$ ,  $\text{Be}^9$ ,  $\text{B}^{10}$ ,  $\text{B}^{11}$ , and  $\text{N}^{14}$ , 10: 369(J)
- tables, 10: 1016

## Nuclear magnetic resonance

- book on, 10: 1920(J)
- effects of magnetic fields on, 10: 201
- Herzian spectroscopy for observation, in weak fields, 10: 2874(J)
- of protons, between 2 and 0.5 Gauss, 10: 2875(J)

## Nuclear models

- alpha particle, of  $\text{Ne}^{20}$ , 10: 2951(J)
- cloudy crystal ball, for scattering of 14-Mev neutrons, 10: 2955(J)
- complex potential, in theory of photonuclear reactions, 10: 1021(J)
- excited levels of even-even nuclei described by, 10: 1535(J)
- independent-particle, analysis of  $\text{Ca}^{41}$ ,  $\text{Ca}^{42}$ , and  $\text{Ca}^{48}$  nuclei, 10: 345(J)
- independent-particle, and low energy nuclear mechanics, 10: 1142(J)
- independent-particle, role of weak surface coupling, 10: 344(J)
- isobar, role in two-nucleon processes, and deuteron disintegration, 10: 2233(J)
- isotope shift and charge distributions by, 10: 2866(J)
- nucleon interactions in a deformed field, 10: 1514(J)
- present state of, review, 10: 1010(J)
- quadrupole moments of  $100 < A < 200$ , explanation for, 10: 1511(J)

## Nuclear models (drop)

- potential flow of rotating nuclei, calculation using, 10: 1516(J)

## Nuclear models (shell)

- beta decay, relation to, 10: 1011(J)
- comparison of super multiplet, j-j, and L-S pairings in, 10: 337(J)
- errors caused by center-of-mass motion, calculations, 10: 1512(J)
- gamma transitions, modification in the formula for, 10: 2865(J)



## Nuclear models (shell) (cont'd)

- with intermediate coupling and beta decay of  $\text{He}^8$ , 10: 328(J)
- nuclear ground-state properties correlated by, 10: 3144(R)
- nuclear magnetic moments correlated by, 10: 1522(J)
- tests for 48- and 50-neutron nuclei, 10: 3653(R)
- theory, 10: 3655
- theory, based on j-j coupling, 10: 2496

## Nuclear particles

(See also Elementary particles; Nucleons; Radiation.)

- binding energy of  $\Lambda^0$  particles in nuclear fragments, 10: 1916(J)
- decay of heavy unstable, 10: 305(J)
- emission from stars of heavy unstable, 10: 303(J)
- emission of light, long-range, in photofission of U, 10: 2901(J)
- lectures on fundamental, by B. Rossi, 10: 324(J)
- life time measurements, 10: 304(J)
- meson-active, decay, 10: 986(J)
- scattering-in corrections for biased samples of, incident on emulsions, 10: 265(J)
- uranium fission into four heavy, 10: 1149(J)

## Nuclear physics

- effective quantum numbers in d- and f-shells, 10: 326(J)
- research at UCRL, 1954 to 1955, review, 10: 3308
- width and spacing of nuclear resonance lines, 10: 332

## Nuclear power

- development in Canada, 10: 504
- economics and physics of, popular lecture, 10: 1977
- feasibility of, in European countries, 10: 123(J)
- industrial research and development in U.K.A.E.A., 10: 1692(J)
- permissible fuel costs with reprocessing, 10: 3249
- radiochemical processing and waste disposal plants, economic aspects, 10: 3248
- research program sponsored by AEC, summary of results, 10: 2168

## Nuclear power plants

- cost estimates, 10: 1332
- cost survey, 10: 3874(R)
- design of, having closed cycle gas turbine, 10: 1150
- development and economic aspects, 10: 1556
- economic aspects and preliminary design of Canadian demonstration, 10: 2882

## Nuclear properties

- eigenvalues for use in nuclear quadrupole spectroscopy, 10: 1519

## Nuclear quadrupole resonance

- of  $\text{Cl}^{35}$ , variation with pressure, 10: 341(J)
- coaxial-cavity spectrometer for measurement of, in  $\text{I}^{127}$ , 10: 2878(J)
- spin-echo production by simultaneous, 10: 1024(J)
- widening, effect of impurities on, 10: 2872(J)

## Nuclear radiation

(See Alpha particles; Beta particles.)

## Nuclear reactions

(See also Fission.)

- analysis of meson absorption, 10: 3032
- in beryllium  $\text{Be}^9$  from  $\alpha$  and d scattering, 10: 1525(J)
- collision matrix for (n,d) and (p,d), contributions of deuteron stripping and pickup, 10: 393(J)
- cross-over transitions in  $\text{Br}^{82}$ ,  $\text{Sb}^{124}$ ,  $\text{Co}^{60}$ ,  $\text{Mn}^{56}$ ,  $\text{Cl}^{35}$ , 10: 3652(R)
- cross section for n-p, in polythene and graphite, 10: 1500(J)

## Nuclear reactions (cont'd)

- determination of particle energies in, analog computer for, 10: 325(J)
- deuteron (d,p), statistical factor influence on cross sections, 10: 2867(J)
- of deuterons on B and C, thresholds and cross sections for, 10: 1579(J)
- direct interactions in, theory of, 10: 2868(J)
- excited state of  $\text{Be}^8$  in  $\text{C}^{12}(\gamma, \alpha)\text{Be}^8$ , 10: 1910(J)
- fission-neutron, nomogram for calculation of cross sections of, 10: 1007(J)
- gamma transitions, modification in the formula for, 10: 2865(J)
- Hartree-Fock calculations for 2-body internucleon, 10: 498(J)
- knock-out process and  $\text{Cu}(n,2n)$  excitation function, 10: 1934(J)
- mechanism and cross sections for  $\text{Li}^7(\gamma, \text{H}^3)\text{He}^4$ , 10: 389(J)
- neutron production in  $\text{H}^3(d,n)$  reaction, 10: 2173
- nitrogen ( $\text{N}^{14}$ ) induced, cross section for  $\text{F}^{18}$  production, 10: 403(J)
- nuclear model with a complex potential in theory of photo-, 10: 1021(J)
- photodisintegration, applications of statistical theory of, 10: 392(J)
- photon initiated, bibliography, 10: 2172
- photoprotons from  $\text{A}^{40}$ , energy and angular distributions of, 10: 1577(J)
- polarization effects, formulas, 10: 1573(J)
- production of  $\Lambda^0$  and  $\Sigma^0$  particles in, 10: 1916(J)
- proton (p,n), in 20 elements at 12 Mev, survey, 10: 2152(J)
- Q-value for  $\text{C}^{14}(d,p)\text{C}^{15}$ , 10: 2870(J)
- review, 10: 1066(J)
- scattering cross sections for (n,p) and (p,p) reactions, 10: 321(J)
- surface scattering of nucleons, angular distribution of  $\gamma$  rays, 10: 1572(J)
- tables of F coefficients for angular correlations, 10: 1008
- width and spacings of nuclear resonance lines in formation and disintegration of compound nuclei, 10: 332

## Nuclear spectra

- analysis of complicated, using direction correlation, 10: 1912(J)
- eigenvalues for use in quadrupole, 10: 1519
- isotope shift and charge distributions, 10: 2866(J)
- rotational, method of obtaining, 10: 1536(J)

## Nuclear spin

- magnetic field effects on, 10: 201
- spin-echo modulation in crystals, 10: 1024(J)
- tables of one particle spin-orbit interaction matrices, 10: 1015

## Nuclear structure

(See also Nuclear models.)

- alpha-particle model generalization, use of localized orbitals, 10: 359(J)
- electric excitation experiments and theory, 10: 1919(J)
- electron scattering and charge distribution of nuclei, 10: 1014
- Hartree-Fock calculations for 2-body internucleon interactions, 10: 498(J)
- of light nuclei, separation energies in relation to, 10: 1973(J)
- relation to thermal-neutron-capture gamma rays, 10: 3224(J)

## Nuclear theory

(See also Nuclear models.)

- angular distribution of  $\gamma$  rays in Coulomb excitation, 10: 364(J)
- beta- $\gamma$  directional correlation formulas, 10: 1988(J)
- boson states in Gell-Mann-Pais, 10: 1141(J)
- charge and spin states of heavy nuclei, 10: 1517(J)
- conversion to zero of renormalized, in pseudoscalar theory with pseudoscalar coupling, 10: 2960(J)
- Coulomb excitation, quantum calculation, 10: 363(J)

## Nuclear theory (cont'd)

- Coulomb excitation directional correlation, quantum calculations, 10: 367(J)
- Coulomb field deviations near nuclei, effect on x-ray fine structure, 10: 2228(J)
- deuteron stability in, 10: 1137(J), 1621(J)
- double meson production in intermediate-coupling theory, 10: 1970(J)
- errors in shell model calculations, 10: 1512(J)
- gamma transition of nuclei, weak and strong coupling approximations, 10: 1972(J)
- Hartree-Fock calculations for 2-body internucleon interactions, 10: 498(J)
- intermediate coupling theory for pseudo-scalar meson field and a nucleon, 10: 1917(J)
- magnetic moment of the nucleon, 10: 2229(J)
- meson charge renormalization in pseudoscalar theory with pseudoscalar coupling, 10: 1962(J)
- meson pair, renormalization of, 10: 1893(J)
- moments of inertia of rotating nuclei, 10: 1515(J)
- nuclear magnetic moments, equations for, 10: 369(J)
- nuclear radii and nuclear forces for heavy nuclei, 10: 350(J)
- nucleon interactions in a deformed field, 10: 1514(J)
- nucleon proper fields, analysis and exact numerical solution, 10: 1918(J)
- Pauli principle expressed as an "exclusion force," 10: 1963(J)
- pion-nucleon scattering, dispersion relations, 10: 2230(J)
- pion-nucleon scattering calculations in the Tamm-Dancoff theory, 10: 2232(J)
- polarization phenomena in scattering, 10: 490
- potential forces, meson theory, 10: 1969(J)
- potential forces in 2-nucleon systems, meson theory, 10: 1967(J)
- pseudoscalar meson, nucleon Green function in, 10: 1134(J), 1135(J)
- quantitative statements of meson phenomena, 10: 1481(J)
- scattering matrix formulation in baryon-meson system, 10: 278(J)
- scattering of nucleons with complex nuclei, theory of direction interaction in, 10: 1971(J)
- statistical theory of photodisintegration, 10: 392(J)
- symmetrical scalar, bound meson problem in, 10: 2054(J)
- Tamm-Dancoff old and new methods for quantum meson theory, 10: 1133(J)
- wave equations, Hamiltonian form of integral-spin, 10: 2231(J)

## Nuclei

- alpha emission, correlations of decay rates with energy, 10: 1948
- binding energies in middle Z, 10: 343(J)
- Coulomb excitation, effects of finite amplitude, 10: 1529(J)
- Coulomb excitation cross sections, 10: 1541(J)
- Coulomb excitation of rare earth, with  $\alpha$  particles, 10: 479(J)
- Coulomb field deviations near, effect on x-ray fine structure, 10: 2228(J)
- elastic scattering of nucleons, theory of direction interaction in, 10: 1971(J)
- electric monopole transitions in, probabilities for, 10: 1530(J)
- electron scattering and charge distributions, 10: 1014
- electron scattering of low-energy relativistic electrons by, measurement of differential cross sections for, 10: 425(J)
- energy levels and decay schemes, tables of, 10: 1520
- energy levels in, of rectangular well shape, 10: 3649(R)
- excitation energy, determination from tracks of recoil nuclei in stars in photographic emulsions, 10: 1017(J)
- excited levels of even-even, 10: 1535(J)
- gamma radiation from Coulomb excitation of, angular distribution, 10: 2147

## Nuclei (cont'd)

- $\gamma$ -ray transition lifetimes, 10: 1109(J)
- gamma transition of, weak and strong coupling approximations, 10: 1972(J)
- heavy, fission by relativistic particles, asymmetry in range of fragments from, 10: 391(J)
- hyperfragments, disintegration, 10: 904(J)
- interaction of light, with nucleons at energy range of  $10^8$  to  $10^{13}$  ev., 10: 2761(J)
- interaction of low-energy neutrons with, theory of, 10: 1499(J)
- interactions with 1000-Mev protons, 10: 907(J)
- isotopic spin impurity in light, 10: 347(J)
- moments of inertia of rotating, 10: 1515(J)
- neutron-capture  $\gamma$  rays, 10: 3656
- neutron scattering at small angles by intermediate and heavy, 10: 2140(J)
- neutron scattering by deformed, 10: 1501(J)
- nuclear forces in complex, 10: 1517(J)
- nucleon scattering by, polarization, 10: 2913(J)
- proton fission cross sections for heavy, 10: 1071(J)
- rotating, with ellipsoidal boundaries, potential collective flow of, 10: 1516(J)
- rotation levels in, calculation of, 10: 492(J)
- rotational levels of, 10: 1019(J)
- rotational spectra, method of obtaining, 10: 1536(J)
- scattering of fast polarized neutrons by, 10: 2909(J)
- separation energies and nuclear structures in light, 10: 1973(J)
- spin  $\frac{1}{2}$ , deviation of magnetic moments from Schmidt limits, 10: 1905(J)
- surface deformation, determination, 10: 327(J)

## Nuclei (cells)

(See also Chromosomes; Genetics; Mitosis; Nucleic acids.)

- hydrogen peroxide concentration in, equations for estimating, 10: 1181(J)

## Nucleic acids

- in bone marrow, effects of radiation administered as single or divided dose in rats, 10: 1184(J)
- desoxypentose, synthesis during microsporogenesis in Tradescantia, 10: 2807(J)
- metabolism, effects of radiation, 10: 3165(R)
- metabolism in guinea pigs, 10: 3327(R)
- radiosensitivity effects of injected, 10: 3768(J)
- sorption and orientation properties of, 10: 507
- synthesis in rat thymus, effect of x irradiation, 10: 3767
- ultracentrifugation analysis of asymmetric high polymer polyelectrolytes, 10: 581

## Nucleons

(See also Neutrons; Protons.)

- alpha reactions, production of mesons by, 10: 3663
- anti-, production and annihilation, 10: 323(J)
- collisions with mesons, production of mesons by, 10: 1970(J)
- correlations with nucleons, effect on scattering of electrons or muons by nuclei, 10: 1023(J)
- coupling to mesons, theory, 10: 496(J)
- double pion production in nucleon-nucleon collisions, selection rules for, 10: 287(J)
- eigenvalues, in deformed fields, 10: 1514(J)
- elastic scattering with complex nuclei, theory of direction interaction in, 10: 1971(J)
- excited states, study of hyperon formation theory, from 10: 2143(J), 3223(J)

## Nucleons (cont'd)

- interaction of, with light nuclei at energy range of  $10^8$  to  $10^{12}$  ev., 10: 2761(J)
- interaction of non-relativistic, 10: 329(J)
- interaction of non-relativistic, elimination of divergences in theory of, 10: 1509(J)
- isobar model in processes involving two, and deuteron disintegration, 10: 2233(J)
- magnetic moment, 10: 2229(J)
- mathematical treatment of, Fermi lectures on, 10: 295(J)
- meson ( $\pi$ ) scattering by, 10: 2134(J)
- meson ( $\pi$ ) scattering by, calculations in Tamm-Dancoff theory, 10: 2232(J)
- meson ( $\pi$ ) scattering by, dispersion relations, 10: 2230(J)
- momentum in nuclei, measurement in photoeffect, 10: 1506(R)
- phase shift calculation in pion scattering, 10: 423(J)
- phase shifts in scattering of, asymptotic expansions, 10: 2950(J)
- $\pi$ -meson scattering by, semiphenomenological theory of, 10: 2848(J)
- pion scattering and magnetic moment calculations using intermediate coupling theory, 10: 1917(J)
- polarization, 10: 1533(J)
- polarization of, scattered by nuclei, 10: 2913(J)
- potential forces in 2-nucleon systems, meson theory, 10: 1967(J)
- proper field of, analysis, 10: 1918(J)
- reactions with leptons, 10: 1011(J)
- scattering, correlation of polarization with, 10: 1598(J)
- scattering by nucleons, interference and polarization in, 10: 3320
- surface scattering,  $\gamma$ -ray angular distribution following, 10: 1572(J)
- weak coupling to nuclear surface, effect on nuclear moments and transition rates, 10: 344(J)

## Nucleosides

- synthesis, 10: 1657(P)

## Nutrients

- radiation effects, 10: 515(R)
- trace elements, effects of availability in soil, on plant and animal nutrition, 10: 1155(J)



## Oak Ridge National Lab., Tenn.

- environs monitoring, 10: 2245
- progress reports, 10: 3488(R)
- progress reports in solid state physics, 10: 3035(R)
- progress reports of Biology Div., 10: 3768(J)
- progress reports of Chemical Technology Div., 10: 3489(R), 3551(R)
- progress reports of Engineering Section, 10: 3798(R)
- progress reports of Health Physics Div., 10: 42(R), 320(R)
- progress reports of the Instrumentation and Controls Div., 10: 3023(R)
- progress reports of Mathematics Panel, 10: 244(R), 10: 3211(R)
- progress reports of Physics Div., 10: 3144(R)
- progress reports of Pilot Plant Section, 10: 3186(R)
- progress reports of Stable Isotope Research and Production Div., 10: 3026(R)
- progress reports on biological research, 10: 1168(R)
- progress reports on chemical technology, 10: 2287(R)
- progress reports on electrochemical studies, 10: 2329(R)

## Oak Ridge National Lab., Tenn. (cont'd)

- progress reports on health physics, 10: 43(R)
- progress reports on spectrographic analysis of tissues, 10: 3173(R)

## Oceanography

- radioactivity in pelagic clays, 10: 1802(J)

## Off-gases

- (See Stack disposal.)

## Oil shales

- fluorimetric analysis for U, 10: 3600
- uranium recovery, process for, 10: 2999(R)

## Oils

- (See also Greases; Lubricants; Vacuum Systems.)

- anticorrosion admixtures to, tracer study of action mechanism, 10: 2041(J)
- flame spectrophotometric analysis for trace metals, 10: 1248(J)
- for Kinney pumps, performance, 10: 3586

## Oleic acid

- labeled with  $C^{14}$ , preparation, 10: 2671

## Opacity

- calculation, method of approximations, 10: 2748
- calculation for light elements at high temperatures, 10: 2748
- Rosseland, for gaseous mixtures, 10: 920(J)
- tables for light elements, 10: 2748

## Optical systems

- (See also Remote-viewing equipment.)
- design for comparison of  $Hg^{198}$  and  $Cd^{114}$  spectra, 10: 2211(J)

## Ores

- (See also specific ores, e.g. Thorium ores; Vanadium ores.)
- picking, development work on Lapointe picker, 10: 795

## Organic acids

- irradiated, paramagnetic resonance, 10: 1308(J), 1309(J)

## Organic compounds

- adsorption on metals from aqueous solutions, 10: 109
- chemical analysis by dry combustion, 10: 1252(J)
- determination of trace amounts in aqueous solutions, 10: 3435
- fluorescence excitation spectra and quantum efficiencies of various crystals, 10: 267(J)
- loop testing facility for, in MTR, 10: 2026
- radiation effects on dilute solutions of DPPH in organic solvents, 10: 1279(J)
- reactor moderator-coolants of, evaluation, 10: 3858
- scintillation properties, in toluene solvent, 10: 1477(J)
- scintillation properties and use as primary and secondary solutes in detectors, 10: 2827(J)
- thermal stability, synthesis for heat transfer liquids, 10: 2054

## Organic compounds, metallo-

- reactions with d-labeled  $CH_3OH$ , isotope effect in, 10: 1224(J)

## Organic moderated reactors

- coolant radioactivity calculated for two points in the cooling systems, 10: 3149
- evaluation of organic compounds as reactor moderator-coolants, 10: 3858

## Organic syntheses

- (See also Fermentation; Reaction mechanisms.)



## Organic syntheses (cont'd)

isotope fractionation effect in, 10: 1310(J)

## Organic zeolites

(See Anion exchange materials)

## Organisms

animal radiation injuries in, effect of radiation intensity on, 10: 25(J)

## Organs

effects of radiation on animal, 10: 1175(J)

## Orientation

(See Preferred orientation.)

## ORNL Graphite Reactor

control rod calibration and reactivity as a function of rod position,  
10: 2514

neutron flux distribution, 10: 3725

neutron flux distribution and production of  $P^{32}$ , 10: 2105

peripheral breeding in, 10: 3402

pile constant calculations for, 10: 3232

startup, and relation to Brookhaven Reactor design, 10: 3731

## ORNL reactors

(See Homogeneous Reactor Experiment; Homogeneous Reactor Test.)

## ORNL Research Reactor

cooling water activity calculations, 10: 2533

design principles and justification as engineering test facility,  
10: 2535

gamma distribution through  $H_2O$  in, 10: 2532

gamma shielding and heat generation, 10: 2561

## Oscillators

(See also Microwave oscillators; Reactor oscillators.)

mathematical analysis, for linear accelerator, 10: 1448

## Oscillographs

sweep circuits in, modification, 10: 3089(P)

## Osmium

Szilard Chalmers reactions, 10: 62

Osmium isotopes  $Os^{186}$ 

energy levels, 10: 3851(R)

formation of, from  $Re^{186}$  by  $\beta$  decay, 10: 1103(J)

Osmium isotopes  $Os^{190}$ 

isomers and partial level assignments, 10: 1022(J)

Osmium isotopes  $Os^{191}$ 

isomer pair calculations, 10: 570(R)

Osmium isotopes  $Os^{192}$ 

energy levels, 10: 3851(R)

energy levels from decay of  $In^{192}$ , 10: 2203(J)

## Ovaries

(See Gonads.)

## Ovens

(See also Furnaces; Kilns.)

design for holding Michelson lamp for spectroscopic measurements,  
10: 2211(J)

## Oxalate complexes

with thorium, determination by thermometric and cryoscopic titrations,  
10: 2637(J)

## Oxalic acid

radiolysis of aqueous solutions of, by  $Co^{60}$  and reactor radiation, 10: 101(J)

## Oxazolium compounds

pharmacological effects, 10: 3328

## Oxidation

of metals at low and medium temperatures, theory, 10: 2060(J)

## Oxide films

(See also specific oxide films, e.g. Aluminum oxide films.)

effects on surface tension of liquid Na, 10: 206(J)

spectrographic analysis by x-ray emission, 10: 1402(J)

## Oxides

chemical reactions with hexachloropropylene, 10: 3546

fission-product, reactions with Na, C, and  $H_2$ , 10: 3857

free energy of formation at elevated temperatures, 10: 1782(J)

sintering mechanisms, 10: 1829(J)

of transition metals, lattice energies, 10: 222

## Oxygen

absorption by water, 10: 1733(J)

absorption on heated Ta filaments, 10: 2476

chemical reactions with CO adsorbed on metallic surfaces, 10: 589(J)

concentration, effects on fusion rate in x-irradiated *Ascaris* eggs,  
10: 2587(J)

determination in He, Na, and NaK, 10: 2258(R)

determination in tank  $N_2$  by dew-point method, 10: 3442

determination in Th after casting, 10: 3427

determination of dissolved, in lubricating fluids, 10: 3268

deuteron reactions, production of  $Be^7$ , 10: 2469

diffusion in Ti and Ti alloys, 10: 1389

effect on radiosensitivity of mammalian cells, 10: 2585(J)

effects on mechanical properties of Ti and Ti alloys, 10: 1388

electrolytic production, 10: 2329(R)

mesonic x rays from capture of  $\mu$  mesons by, 10: 1484(J)

neutron cross sections, 10: 3669

nuclear magnetic resonance of  $O^{17}$  in various nitrogenous compounds,  
10: 1125(J)

photodisintegration, comparison to photodisintegration of deuteron,  
10: 1506(R)

$\pi^-$  meson interactions, 10: 274(J)

reaction with hot Cu in separation from gas mixtures, 10: 3486

reactions with Cu, isotope effect in, 10: 594(J)

reactions with hydrogen gas at liquid air and at room temperatures,  
10: 2619(J)

removal from aqueous solutions by gas-bubbling, 10: 3106

solubility in  $UO_2F_2$  at elevated temperatures, 10: 2681

solubility in  $H_2O$  and aqueous  $UO_2F_2$  and  $UO_2SO_4$  solutions, 10: 3121

## Oxygen electrodes

high-temperature potentials, 10: 580(R)

## Oxygen isotopes

separation by convection diffusion, 10: 2799(J)

separation by flow through a high surface area silica powder pack,  
10: 3837

Oxygen isotopes  $O^{14}$ 

decay, 10: 1605(J)

Oxygen isotopes  $O^{16}$ 

excited states, measurement, 10: 395(J)

Oxygen isotopes  $O^{18}$ 

alpha reactions ( $\alpha, n$ ) in  $PoO_2$ , 10: 3648

**Oxygen isotopes  $O^{16}$  (cont'd)**

- deuteron reaction (d,n), neutron threshold and cross section measurements, 10: 395(J)
- deuteron reactions (d, $\alpha$ ), 10: 1506(R), 1903(R)
- deuteron reactions (d,  $\alpha$ ) effects of incident particle energy on, 10: 3329(R)
- gamma reactions ( $\gamma$ , $\alpha$ ), and energy levels, 10: 2176(J)
- gamma reactions ( $\gamma$ ,n), yield curve, 10: 2178(J)
- proton scattering at 19 Mev, and energy levels, 10: 2160(J)
- spin-spin doublets, theory, 10: 3656
- transitions and dipole selection rule in, 10: 371(J)

**Oxygen isotopes  $O^{17}$** 

- energy level in the areas of higher excitation, study of, 10: 342(J)
- nuclear magnetic resonance in various nitrogenous compounds, 10: 1125(J)

**Oxygen isotopes  $O^{18}$** 

- alpha reactions ( $\alpha$ ,n) $Ne^{21}$ , 10: 1933(J)
- deuteron reactions (d, $\alpha$ ), 10: 1538(J)
- isotopic exchange of between tungstate and  $H_2O^{18}$ , 10: 1226(J)
- oxygenated  $H_2O$  formation by  $\gamma$  radiation in aqueous solutions containing, 10: 100(J)

**Oxygen-nitrogen systems**

- gasometric analysis for nitrogen oxides and acids, 10: 3781(J)

**Oxygen-uranium systems**

- phase studies, 10: 3185

**Oxygen-zirconium systems**

- tensile properties, 10: 1804

**Ozonosphere**

- shock wave propagation in, 10: 3288
- temperature and wind velocity measurements by shock wave propagation, 10: 3288

**P****Package power reactors**

- analysis of kinetics of, by reactor simulator, 10: 3383
- shielding for APPR, design, 10: 1563

**Packed columns**

- gas-film mass transfer, 10: 1733(J)
- heat and mass transfer in, 10: 134(J)
- loading and flooding, 10: 1334(J)

**Pair production**

(See also Ion pair production.)

- by electrons (trident process), mean free path in emulsion, 10: 220(J)
- ionization reduction near the origin, 10: 918(J)
- in lead, by  $Bi^{214}$   $\gamma$  rays, 10: 1911(J)

**Palladium**

- chromatographic separation and colorimetric determination, 10: 622(J)
- gravimetric determination with 4-methyl and 4-isopropyl-1,2-cyclohexanedione dioxime, 10: 1742(J)
- neutron cross section at 120 ev and 345 ev, 10: 3656
- neutron reactions (n,p) at 14 Mev, cross sections, 10: 338(J)
- scorptive properties for boron compounds, 10: 1724
- vapor pressure, 10: 62

**Palladium alloys**

- corrosion in 500 and 600°F water, 10: 1806

**Palladium catalysts**

- corrosive effects of hydrogen and ammonium reactions on surface of, 10: 2061(J)

**Palladium-hydrogen systems**

- neutron-diffraction analysis, 10: 3144(R)

**Palladium isotopes**

- gamma yields from Coulomb excitation, 10: 3144(R)

**Palladium isotopes  $Pd^{106}$** 

- energy levels, 10: 2202(J)

**Palladium isotopes  $Pd^{108}$** 

- formation cross section from deuteron bombardment of U, 10: 2239(J)
- formation cross sections of, from  $U^{238}$  bombarded with 19- to 190-Mev deuterons, 10: 2237

**Palladium isotopes  $Pd^{112}$** 

- formation cross section from deuteron bombardment of U, 10: 2239(J)
- formation cross sections of, from  $U^{238}$  bombarded with 19- to 190-Mev deuterons, 10: 2237

**Paper chromatography**

(See Chromatography.)

**Parabiosis**

- of eggs in embryogenesis, 10: 5(J)
- of eggs in embryogenesis, natural and immunological heteroagglutinins in, 10: 7(J)

**Paradise Prospect (Nev.)**

- mineralogy, 10: 1358

**Paraffin**

- penetrating showers produced in, at 2760 m and 25°N geomagnetic latitude, 10: 218(J)

**Paramesium**

- effects of ultraviolet radiation on mating reactions, 10: 3327(R)
- radioinduced mutations, role of  $H_2O_2$ , 10: 1986(J)
- radiosensitivity of cytoplasmic kappa bodies, 10: 3408(R)

**Parathyroid extracts**

- metabolic effects on Pu uptake in dogs, 10: 1160(R)

**Particle accelerators**

(See Accelerators.)

**Particle collectors**

(See also Filters.)

- efficiency for collection of radioactive fission products from air, 10: 2592

- impactor design to separate aerosols by particle size and detect Pu dust, 10: 2828(J)

- performance in Mallinckrodt plant, 10: 1159(J)

**Particle statistics**

- kinetic theory of a system of interacting particles, 10: 491(J)

**Particle tracks**

(See also Photographic film detectors.)

- measurement of curvature, length, and spatial direction in cloud chambers by stereoscopic means, 10: 967(J)

- unstable particles formation and decay, observations of, 10: 2849(J)

**Particles**

(See also specific particles, e.g. Alpha particles; Beta particles.)

- dynamical system of, with forces between them, 10: 1619

## Particles (cont'd)

- interactions between gas, influence on ionization equilibrium, 10: 229(J)
- lung hazards from inhaled in rats, tracer studies, 10: 2006
- new unstable, mass determination from range-energy relations, 10: 311(J)
- of radoruthenium, deposition in lungs, autoradiographic dosage determinations on, 10: 1203
- respiratory tract retention, measuring apparatus, 10: 1982
- strong interaction of clusters, approximation method for analysis, 10: 493(J)
- unstable, theory of production and behavior, 10: 495(J)
- with zero spin, asymptotic behavior of Green's function in electrodynamics of, 10: 1139(J)
- zero spin, theory of turbulence and asymptotic behavior of Green's functions in electrodynamics of, 10: 1138(J)

## Pegmatite deposits (Colo.)

- occurrence, 10: 1352

## Pegmatites

- of graphite containing rare metals, genesis of, 10: 810(J)

## Pennsylvania

- radioactivity of bituminous coal region of western, 10: 152
- radioactivity of coals and associated rocks and U occurrence in Beaver, Clearfield, and Jefferson Cos., 10: 2065

## Pennsylvania Salt Mfg. Co., Philadelphia

- progress reports on polymer preparation, 10: 739(R)

## Pennsylvania State Univ., University Park

- progress reports on coordination polymers, 10: 1727(R)
- progress reports on petrographical investigations of the Salt Wash sediments, 10: 149(R)

## Pennsylvania State Univ., University Park. Mineral Industries Experiment Station

- progress reports on beneficiation of Florida leached zone material, 10: 1720(R)

## Pennsylvania State Univ., University Park. Petroleum Refining Lab.

- progress reports on fluids, lubricants, fuels, and related materials, 10: 892(R)

## Pentaether

- (See Tetraethylene glycol, debutoxy-.)

## Pentalene moderated reactors

- (See Organic moderated reactors.)

## Pentalenes

- corrosive effects on Al alloys, 10: 3005

~~Pentanes~~

- thermodynamic properties in bubble chambers, 10: 960(J)

## -Pentanone, 4-methyl-

- inflammability limits and ignition temperatures in air and air-nitrogen oxide mixtures, 10: 2254
- polarographic determination, 10: 2291
- solvent properties for TTA, 10: 2333
- solvent properties for  $\text{UO}_2(\text{NO}_3)_2$ , 10: 2331

## -Pentanone, 4-methyl--nitric acid systems

- phase diagrams, 10: 1817

## Perchloric acid

- free-radical formation in, effect of  $\gamma$  irradiation on, 10: 2218(J)
- solvent properties for TTA and  $\text{U}^{4+}$ , 10: 3566

## Periodic systems

- anomaly of atomic weights in Mendeleev's, 10: 1254(J)

## Periodic systems (cont'd)

- calculations of atomic radii for Mendeleev's elements, 10: 626(J)

## Periscopes

- design, for Hanford Works, 10: 3621

## Perovskites

- magnetic structure, 10: 320(R)
- neutron-diffraction analysis, 10: 3144(R)

## Perrhenates

- corrosion-inhibiting action on Fe and steel, 10: 2710(J)

## Pertechnetates

- corrosion-inhibiting action on Fe and steel, 10: 2709(J)

## Perturbation theory

- application to Boltzmann formulation of pile equation, 10: 3719
- applied to calculations of effect on reactivity of MTR of small, nonuniform changes to the composition of the core or reflector, 10: 2888
- calculation of changes in reactivity due to changes in reactor composition, 10: 373
- operator formalism in quantum, 10: 1130
- radiation damping considerations in, 10: 1626(J)
- reactor analysis by, 10: 2108
- two-group, for reactivity change calculations, 10: 3148

## Peterino Claims

- geophysical exploration, geology, 10: 1350

## Petroleum-methyl borate systems

- phase studies, 10: 60

## Phase studies

- (See also Diffusion; Solutions.)
- order-disorder transformations, theory of kinetics of, 10: 1834(J)

## Phenol, 2,2'-methylenebis[3,4,6-trichloro-]

- reactions with uranium oxides and uranyl solutions, 10: 2373

## Phenols

- substituted acids of, analytical properties in determinations of Th and Zr, 10: 2638(J)

## Phenyl ether-biphenyl systems

- corrosive effects on construction metals, 10: 3005
- evaluation as a reactor coolant, 10: 2897

## Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho.

- progress reports on MTR, 10: 2142(R), 2449(R)
- progress reports of MTR Technical Branch, 10: 3825

## Phosphate glass

- preparation of, and properties of silver-activated as radiation dosimeters, 10: 955(R)
- silver bearing, radiation effects and performance as dosimeter, 10: 3301

## Phosphate rocks

- decomposition and spectrophotometric analysis for U, 10: 2284
- uranium recovery with OPPA, 10: 2045

## Phosphate slurries

- recovery of U from, 10: 710(R)

## Phosphates

- analysis for fluorine, 10: 1243(J)
- colorimetric determination in U waste solutions, 10: 2290
- decomposition of monalkyl, in aqueous solutions by electrons and  $\gamma$  radiation, 10: 102(J)
- determination of, in U concentrates, 10: 660(R)
- diffusion in aqueous solutions at 22°C, 10: 3777
- metabolism in Scenedesmus, effect of illumination, tracer study, 10: 3098



## Phosphates (cont'd)

- recovery by ion exchange, 10: 107(R)
- recovery of U by solvent extraction, 10: 694(R)
- recovery of U from, 10: 693(R)
- separation and identification by ion exchange, 10: 618(J)
- synthesis and properties of methylsilyl-, 10: 2670(R)
- uranium recovery, 10: 689(R), 1289(R)
- uranium recovery from leach solutions by solvent extraction with, 10: 698(R)

## Phosphonates

- synthesis and properties, 10: 2670(R)

## Phosphorescence

(See also Fluorescence; Luminescence; Phosphors.)

- of zinc sulfide phosphors, electron localized levels, storage, 10: 970(J)

## Phosphoric acid

- cost of cooling, in a 174-gpm solvent-extraction plant, 10: 2749
- dehydration products, identification, 10: 618(J)
- free-radical formation in, effect of  $\gamma$  irradiation on, 10: 2218(J)
- recovery of U from, 10: 676(R)
- recovery of U from, by ion exchange, 10: 677(R)
- recovery of U from, by solvent extraction, 10: 566(R), 677(R), 683(R), 686(R)
- reduction, electrolytic method for, 10: 2617
- spectrographic analysis for U, 10: 682(R)
- uranium recovery, 10: 689(R), 1289(R)
- uranium recovery by solvent extraction from industrial, 10: 3112
- uranium recovery during manufacture, 10: 701(R)
- uranium recovery from, and corrosive effects, 10: 687(R)
- uranium recovery from, by liquid-liquid extraction, 10: 684(R)
- uranium recovery from, by precipitation and solvent extraction, 10: 680(R)
- uranium recovery from industrial, 10: 685(R)
- uranium recovery from industrial, by liquid-liquid extraction, 10: 681(R)
- uranium recovery from industrial, by liquid-liquid extraction or precipitation, 10: 678(R)
- uranium recovery from solutions, 10: 702(R)

## Phosphoric acid, alkyl esters

- distribution coefficients in organic solvents, 10: 3496
- preparation and properties, 10: 685(R)
- preparation of, for U and V extraction from carnotites, 10: 706(R)
- solvent properties for U, 10: 2678, 3122

## Phosphoric acid, ribulose esters

- ultraviolet spectra, 10: 1729(R)

## Phosphors

(See also Luminescence; Phosphorescence.)

- deterioration of luminescent, by positive ion beams, 10: 1098(J)
- development of thin sandwich, 10: 3852(R)
- electroluminescence, impact excitation mechanism for, 10: 1449(J)
- formula for a neutron scintillator, 10: 1837(R)
- liquid, fluorescence and conductivity phenomena, 10: 251(R)
- optical cement for NaI(Tl), 10: 1891(J)
- organic, fluorescence excitation spectra and quantum efficiencies, 10: 267(J)
- preparation of plastic, 10: 1837(R), 1872

## Phosphors (cont'd)

- relative  $\gamma$  response, 10: 1411(R)
- response of inorganic, organic, and plastic, 10: 1888(J)
- response to gamma radiation, 10: 3023(R)
- storage and the origin of electron localized levels in ZnS, 10: 970(J)
- zinc sulfide, decay laws of afterglow, 10: 2847(J)

## Phosphorus

- as corrosion inhibitor when admixed to oils, tracer study, 10: 2041(J)
- determination in Si by radioactivation analysis, 10: 1746(J)
- flame photometric determination in organophosphorus compounds, 10: 619(J)
- metabolism by *E. coli*, effects of radiation and certain organic chemical compounds, 10: 3252
- metabolism in domestic animals, tracer study, 10: 3769(R)
- metabolism of, by *S. cerevisiae*, 10: 511
- neutron reactions ( $n, \alpha$ ), ( $n, p$ ), and ( $n, \gamma$ ), and use as neutron detector, 10: 3646
- uptake by barley, factors affecting, 10: 508

## Phosphorus compounds

- flame photometric determination of P in organic, 10: 619(J)

Phosphorus isotopes  $P^{30}$ 

- excited states, determinations, 10: 1411(R)

Phosphorus isotopes  $P^{31}$ 

- deuteron reactions ( $d, n$ ), angular distribution of neutrons, 10: 1570(J)
- gamma radiation from deuteron bombardment of, 10: 1576(J)
- nuclear magnetic moments, 10: 2879(J)

Phosphorus isotopes  $P^{32}$ 

- effects on growth of transplanted tumors in mice, 10: 2600(J)
- formation from atmospheric A by cosmic radiation, 10: 2763(J)
- production in ORNL Graphite Reactor, 10: 2105

## Phosphorus oxides

- precipitation of, from Florida leached zone material, 10: 712(R)

## Photochemistry

(See also Photosynthesis.)

- development of an uranyl oxalate actinometer for, 10: 750(J)

## Photodisintegration

- cross section, variation with atomic number, 10: 1506(R)

## Photoelectric cells

(See also Crystal detectors; Photomultiplier tubes; Radioelectric cells.)

- fire sensitive, effect of  $\gamma$  radiation on, 10: 2553

## Photoelectric effect

- in highly ionized atoms, absorption coefficients, 10: 1836

## Photoemission

(See Photoneutrons.)

## Photofission

- of uranium into four heavy fragments, 10: 2238(J)
- of uranium nuclei with emission of light long-range particles, 10: 1073(J)

## Photofission products

- angular distribution of from  $U^{238}$ , 10: 2964

## Photographic emulsions

(See also Nuclear emulsions; Photographic film detectors.)

- latent image centers in, regression of, 10: 958(J)

**Photographic film detectors**(See also Nuclear emulsions.)

beta activity of fission products measured by, 10: 1479(J)

beta measurement by, temperature effects on, 10: 2482

effect of body back scatter on performance, 10: 252

performance for  $\gamma$  dosimetry, 10: 2810

performance of, as dosimeters for use by workers in the fields of radiotherapy and nuclear physics, 10: 543(J)

as radiation monitors by measuring induced fluorescence, 10: 3214(J)

standard calibration curve for, 10: 974(J)

**Photography**(See also Cameras; Photomicrography; Spark shadowgraph photography.)

of living organisms, differential optical staining, 10: 1979(J)

**Photomesons**production of  $\pi^+$ , from H and D, 10: 1903(R)**Photomicrography**(See also Microscopy.)

of uranium fission into four heavy fragments, 10: 1149(J)

**Photomultiplier tubes**

development, 10: 1411(R), 3021(R)

pulse limiter and shaper for, design, 10: 1676(P)

**Photon showers**

high energy, in nuclear emulsions, theoretical analysis, 10: 902(J)

**Photoneutrons**

angular distribution, from deuterium, 10: 3655

energy and angular distributions of, from Pb, Sn, Cu, Fe, Al, C, and Be, 10: 1899(J)

from fission products of  $U^{235}$ ,  $U^{233}$ , and  $Pu^{239}$  in  $D_2O$ , 10: 2860(J)from uranium isotopes ( $U^{235}$ ) fission products in Be, 10: 2859(J)

yields from sources of, 10: 3650(R)

yields of Be when irradiated by  $Sb^{124}$  and  $La^{140}$   $\gamma$  rays, 10: 3732**Photons**(See also Gamma radiation; X radiation.)

absorption, comparison of diffusion theory and transport theory results, 10: 1085

beams electron loss, 10: 2841(J)

Compton scattering of 140-Mev, 10: 1009(R)

elastic scattering by nuclei, 10: 434(J)

energy loss in various materials, 10: 2173

energy spectrum of, generated in cascading electromagnetic processes, 10: 2957(J)

nuclear reactions, bibliography, 10: 2172

nuclear reactions  $Ni(\gamma, p)$  of 21.5- to 28.0-Mev, energy and angular distribution, 10: 1069(J)**Photoperiodism**

effects on chemical reactions during photosynthesis, 10: 3104

effects on indoleacetic acid oxidase in lupine, 10: 1161(R)

effects on phosphorus metabolism in plants, tracer study, 10: 3098

**Photoprotons**from argon,  $A^{40}$ , energy and angular distributions, 10: 1577(J)

coincidences with protons in various nuclei, 10: 1506(R)

**Photosynthesis**(See also Photochemistry.)

in aquatic plants, theory, 10: 3164

**Photosynthesis (cont'd)**

enzymatic factors, 10: 1168(R)

chlorophyll photochemistry, spectroscopy, and fluorescence during, 10: 3766(J)

kinetics and identification of intermediates, 10: 1207(J)

phosphate transients during, tracer study, 10: 3098

photochemical reaction mechanisms and intermediate products, 10: 3104

photochemical reactions, 10: 3768(J)

thermodynamics of carbon-reduction cycle, 10: 1729(R)

**Photosynthetic products**

thermodynamic properties, 10: 1729(R)

**Phthalates**

chemical determination, 10: 3461

**Physical chemistry**(See also Thermodynamics.)

problems in, applications of high-speed computers to, 10: 245

theory of chemical rate processes, 10: 563

**Pickling**

explosions while treating Zr and U alloys, 10: 3615

**Picric acid complexes**

infrared spectra, 10: 3048

**Pierce Shale Formation (Colo.)**

exploration, 10: 1352

**Pipe joints**(See also Disconnects; Gaskets.)

welded, in low alloy steel, fatigue and static properties, 10: 2713

**Pipes**(See also Tubes.)

analysis of stress and mechanical properties of systems, evaluation of methods, 10: 119

cutting, design of remote-control devices for, 10: 1659(P)

molecular flow conductance of air in elliptical cross section, 10: 761

**Pipettes**

micro-, design, 10: 1161(R)

**Pitchblendes**

analysis for Ba, 10: 3447

analysis for Np and Pu, 10: 2468

analysis for U by NBS procedure, 10: 3457

analysis of Ra to U ratio, 10: 3448, 3450

digest slurries, filtration, 10: 1290

formation, synthesis, occurrence, 10: 150

freezing point determination, 10: 1146

genesis and occurrence in Eureka Gulch Area (Colo.), 10: 1363(J)

radon measurements from, in warehouse and box cars, 10: 3413

**Pittsburgh. Univ.**

progress reports on calorimetry, 10: 2023(R)

**Pituitary gland**pathological effects of  $I^{131}$  in rats, 10: 3251

radiosensitivity effects in rats, 10: 3767

**Pituitary hormones**labeled with  $I^{131}$ , preparation and physiological effects of prolactin, 10: 2606(J)**Placer deposits (Alaska)**

occurrence in Ear Mountain Area, 10: 1362(J)

**Placer deposits (N. C.)**

- occurrence, 10: 1357
- occurrence in Cleveland and Lincoln Cos., 10: 804
- occurrence in First Broad River Area, 10: 805

**Plant cells**

- behavior, chemical factors, 10: 2571
- genetic effects of radiation, 10: 1168(R)
- radiation effects, 10: 3768(J)
- radiosensitivity of, factors affecting, 10: 517

**Plant metabolism**

- of calcium, P, and Sr, by barley, factors affecting, 10: 508
- of iron, tracer study, 10: 555
- of phosphates, effect of illumination on, tracer study, 10: 3098
- of strontium, factors affecting, in barley and tomato plants, tracer study, 10: 554

**Plant physiology**

- photochemistry, spectroscopy, and fluorescence of chlorophyll, 10: 3766(J)

**Plants**

- effects of radioactivity from absorbed fission products on, 10: 513(R)
- potassium ( $K^{42}$ ) uptake by, scintillation detector for study of, 10: 255(J)
- radioinduced mutants in, 10: 1(R)
- radiosensitivity, effects of boron nutrition, 10: 1161(R)
- spectrographic analysis for Ca and Sr, 10: 2973

**Plasma**

(See also Blood plasma; Lymph.)

- currents and discharge in, 10: 2776(J)
- diffusion across magnetic field, due to collision of like particles, 10: 2961(J)
- discharge in, magneto-hydrodynamics of, 10: 2775(J)
- excitation spectrum, in periodic field of ions, 10: 914(J)
- instability, observation in liquid Na magnetohydrodynamic model, 10: 1853
- interaction with electromagnetic waves, 10: 1437(J)
- magnetic fields in turbulent, from flame gases of burner operated on O and propane, 10: 2771(J)
- particle transport, electric currents, and pressure balance in, 10: 915(J)
- spark discharge in, theory of the development of the channel of, 10: 2772(J)
- theory, 10: 1854(J)
- transient responses and boundary value of processes in semi-infinite, 10: 895(J)
- velocity distribution of electrons, 10: 225(J)

**Plastic deformation**

- cold working and recrystallization of metals, 10: 184(R)
- Poisson's coefficient during, measurement of change, 10: 870(J)

**Plastic films**

- method for preparing nylon, 10: 3652(R)

**Plastics**

- blast effects from atomic explosions on, 10: 758
- casting of astrolite cylinders, 10: 1468
- for corrosion-resistant applications, book on, 10: 1228(J)
- electric conductivity, during x irradiation, 10: 3739
- electrical resistance, tensile strength, elasticity, hardness, and optical properties, radiation effects on, 10: 3127
- fabrication and use in coils, magnets, and vacuum equipment, 10: 3205

**Plastics (cont'd)**

- lucite, moderating characteristics of foil holders, 10: 3154
- paramagnetic resonance in, x-irradiation effects on, 10: 2217(J)
- properties of fluorothene, 10: 2404
- as protection against radiation injury during decontamination procedures, 10: 2247
- radiation dose measurement by increase of optical absorption of, 10: 1478(J)
- scintillation detector of tetraphenyl-butadiene dissolved in polystyrene, 10: 269(J)
- testing in Zr process solutions, 10: 3278
- thermal conductivity of lucite, 10: 3641
- toxic effects of exposure to, 10: 549(J)

**Plates**

(See also Reactor fuel plates.)

- heat transfer and thermal stresses in unrestrained flat, and applications to Materials Testing Accelerator targets, 10: 3734
- stress analysis of circular, under centrally applied moments, 10: 888

**Platinum**

- chromatographic separation and colorimetric determination, 10: 622(J)
- electric resistivity, influence of holes in crystal lattice on, 10: 871(J)

**Platinum catalysts**

- corrosive effects of hydrogen and ammonium reactions on surfaces of, 10: 2061(J)

**Platinum-cobalt alloys**

- phase studies, x-ray-diffraction measurements, 10: 2082

**Platinum isotopes**

- electromagnetic separation, 10: 105
- neutron absorption cross sections, 10: 320(R)
- search for  $Pt^{209}$  and  $Pt^{202}$ , 10: 3295

**Platinum isotopes  $Pt^{182}$** 

- energy levels, 10: 3851(R)
- energy levels from decay of  $Ir^{182}$ , 10: 2203(J)

**Platinum isotopes  $Pt^{196}$** 

- Coulomb excitation, angular distribution of  $\gamma$  rays from, 10: 2145(J)

**Platinum isotopes  $Pt^{198}$** 

- conversion electrons from electric excitation of, 10: 2153(J)

**Platinum metals**

- separation from U-base materials and spectrographic determination, 10: 604

**Platinum-uranium alloys**

- phase studies, 10: 3603

**Platinum-uranium couples**

- thermal emf of, 10: 2441

**Plutonium**

(See also Actinides; Transuranic elements.)

- absorption and emission spectra, 10: 486(J)
- adsorption on W, heat of vaporization, and ionization potential measurements, 10: 3499
- allotropic transformations, dilatometric studies on, 10: 2349
- analysis for carbon, 10: 2300
- chromatographic determination using radioactive reagents, 10: 3351
- consumption rate in feedback systems, 10: 3313(R)
- crystal structure and thermal expansion, 10: 741
- delayed neutron emissions from, 10: 3651(R)
- delayed neutron yields from fast and thermal fission, 10: 330



## Plutonium (cont'd)

detection of airborne contamination with annular impactor, 10: 2828(J)

determination, 10: 3433

determination in fission products, 10: 1230

determination in pitchblende, 10: 2468

determination in Na and K solutions by  $\text{LaF}_3$  procedure, 10: 2972

disproportionation of  $\text{Pu}^{4+}$  ions in HCl and complex formation, 10: 1763(J)

distribution between Mg-MgX<sub>2</sub> systems, 10: 3502

distribution in Sr-SrBr<sub>2</sub> and Ba-BaBr<sub>2</sub> systems, 10: 3503

distribution in U-UBr<sub>3</sub>, Mn-MnCl<sub>2</sub>, and Ca-CaCl<sub>2</sub> systems, 10: 3501

distribution in U-UBr<sub>3</sub> and Pb-PbCl<sub>2</sub> systems, 10: 3500

electrochemical properties, 10: 3500, 3501, 3502, 3503

electrodeposition from acid solutions, 10: 3275

electrolytic oxidation of  $\text{Pu}^{4+}$  to  $\text{Pu}^{6+}$ , 10: 2675(J)

energy band structure calculations, 10: 3405(R)

evaporation from U reactor fuel, 10: 3797

extraction with  $\text{BiPO}_4$ , 10: 3504

gamma-absorption determination in aqueous solutions, 10: 3105

gravimetric determination in In-Pu solutions, 10: 2282

handling, facilities and techniques for, 10: 110(J)

liquid metal extraction, 10: 62

liquid metal extraction from Ag-U alloys, 10: 2379

liquid metal extraction from U, 10: 569(R), 570(R)

metabolism by suckling rats, mice, and cats following administration to the mothers, 10: 3408(R)

microvolumetric assay, 10: 2295

oxidation to the plutonyl state, 10: 2347

pathological effects, metabolism of, and influence of parathyroid extracts on metabolism in dogs, 10: 1160(R)

physiological effects and toxicity in rats, 10: 1200

production rates in pile-exposed U<sup>235</sup>, 10: 3853(R)

purification, following recovery from waste, 10: 3504

radiometric determination, 10: 3434(R)

radiometric determination in urine, application of nuclear emulsions to, 10: 2294

reactivity after irradiation, 10: 3313(R)

redox reaction rates, 10: 2346(R)

reduction by nitrous acid, 10: 2345

separation from fission products and U by ion exchange, 10: 1319

separation from liquid U by  $\text{UF}_4$  volatilization, 10: 3348

separation from neutron-irradiated U, 10: 1762(J)

separation from neutron-irradiated U, survey, 10: 1761(J)

separation from U by U-Sn alloy extraction, 10: 3553

separation from U by vacuum distillation, 10: 2074

solvent extraction, continuous operation, 10: 2332

solvent extraction with TBP, 10: 3496

spectrographic analysis, comparison of two methods for, 10: 3438

spectrophotometric determination, 10: 2301

thermal analysis, 10: 2350

tissue distribution and toxicity in rats, 10: 2242(R)

tissue distribution in swine, 10: 3409(R)

## Plutonium-bismuth alloys

analysis for Bi, 10: 2352

## Plutonium bromides

volatilization at 800°C, 10: 2379

## Plutonium-cadmium alloys

analysis for Cd, 10: 2351

## Plutonium(III) chlorides

preparation and physical properties, 10: 3505

preparation of anhydrous, 10: 2615

## Plutonium complexes

chemical properties and absorption spectra, 10: 2346(R)

## Plutonium compounds

chemical properties, 10: 3416

x-ray-diffraction analysis and crystal structure, 10: 2456

## Plutonium fluorides

preparation and thermodynamic properties, 10: 2344

## Plutonium(IV) fluorides

volatilization at 800°C, 10: 2379

## Plutonium(VI) fluorides

infrared spectra, 10: 1313(J)

infrared spectra and thermodynamic properties, 10: 1312(J)

## Plutonium hydroxides

precipitation, 10: 3504

## Plutonium(III) ions

oxidation, hydrolysis, and spectra, 10: 3504

## Plutonium(IV) ions

disproportionation in HCl and complex formation, 10: 1763(J)

oxidation, reduction, and hydrolysis, 10: 3504

## Plutonium isotopes

formation by neutron irradiation of  $\text{Am}^{241}$ , 10: 3024

relative abundance of  $\text{Pu}^{239}$ ,  $\text{Pu}^{240}$ ,  $\text{Pu}^{241}$ , 10: 3745(R)

spontaneous fission half lives and formation from irradiation of  $\text{Am}^{243}$ , 10: 353(J)

Plutonium isotopes  $\text{Pu}^{238}$ 

alpha spectrum, measurement, 10: 336(J)

Plutonium isotopes  $\text{Pu}^{239}$ 

absorption and fission cross sections, and temperature coefficients of reactivity, 10: 2495(R)

alpha spectrum, measurement, 10: 336(J)

deuteron reactions, spallation-excitation functions, 10: 1729(R)

energy produced by, calorimetric determination of, 10: 2348

fission, delayed neutrons from, 10: 2505

long-range particles from, 10: 2929(J)

metabolism of, by laboratory animals, 10: 513(R)

neutron absorption cross sections at 0.01 to 3.0 ev, 10: 2506

neutron absorption cross sections from 5 to 50 kev, 10: 3144(R)

neutron capture cross sections, 10: 1411(R)

neutron fission and absorption cross sections, 10: 340(J)

neutron fission cross section from  $\sigma_f(\text{Pu}^{238})/\sigma_f(\text{U}^{235})$ , 10: 2504

neutron fission cross sections, from 0.01 to 100 ev., 10: 3667

nuclear properties at 250 and 300°C, 10: 3666

photoneutron yield from fission products, in  $\text{D}_2\text{O}$ , 10: 2860(J)

production in thermal reactors, 10: 3874(R)

prompt neutrons from fission, angular correlation measurements, 10: 1004(J)

Plutonium isotopes  $\text{Pu}^{240}$ 

alpha spectrum, measurement, 10: 336(J)

deuteron reactions, spallation-excitation functions, 10: 1729(R)

effective neutron pile absorption cross sections, 10: 3853(R)

**Plutonium isotopes Pu<sup>240</sup>** (cont'd)

- production in thermal reactors, 10: 3874(R)
- spontaneous fission, distribution of prompt neutrons, 10: 400(J)

**Plutonium isotopes Pu<sup>241</sup>**

- abundance determination, in small samples, 10: 2494(R)
- beta half-life determination, 10: 2556
- production in thermal reactors, 10: 3874(R)

**Plutonium isotopes Pu<sup>242</sup>**

- half lives, 10: 1729(R)

**Plutonium isotopes Pu<sup>244</sup>**

- spontaneous fission half life, 10: 353(J)
- thermal neutron capture cross sections, 10: 460(J)

**Plutonium isotopes Pu<sup>245</sup>**

- beta decay, 10: 459(J)
- formation and  $\beta$ -decay half life, 10: 460(J)
- neutron capture cross sections, 10: 2042

**Plutonium isotopes Pu<sup>246</sup>**

- formation by neutron irradiation of Pu<sup>245</sup> and separation from target materials, 10: 2042
- half life, 10: 2210(J)

**Plutonium nitrides**

- preparation by heating Pu in N, and by heating Pu hydride in N to high temperatures, 10: 2676(J)
- properties, 10: 2676(J)

**Plutonium oxalates**

- crystal structure, 10: 3504
- decomposition, 10: 3506
- solubility in HCl or HNO<sub>3</sub>, 10: 3504

**Plutonium oxides**

- hydrofluorination, heat of reaction and equilibrium constants, 10: 3507

**Plutonium perchlorates**

- activity coefficients, 10: 2354

**Plutonium peroxides**

- crystal structure, preparation, and properties, 10: 1760

**Plutonium phosphates**

- crystal structure, 10: 3504
- solubility in HCl or HNO<sub>3</sub>, 10: 3504

**Plutonium poisoning**

- therapy by metal displacement, 10: 3408(R)

**Plutonium silicides**

- crystal structure of  $\beta$  PuSi<sub>2</sub>, 10: 88(J)

**Plutonium-titanium alloys**

- analysis for Ti, 10: 2302

**Plutonium-uranium alloys**

- vacuum distillation of, for Pu and U separation, 10: 2074

**Plutonyl nitrates**

- decomposition, 10: 3506

**Plywood**

- gamma scattering, 10: 2549

**Pneumococci**

- desoxyribonucleic acid of, effects of  $\gamma$  radiation on, 10: 30(J)

**Poison Spring Canyon Area (Utah)**

- geology, 10: 800

**Polar Mesa Camp District (Utah)**

- geology, area favorable for U deposits, 10: 1361(J)

**Polarographs**

- design, 10: 3474

**Polarography**

- pre-removal of oxygen from aqueous solutions, 10: 3106
- theory and experimental techniques, 10: 2628
- theory of polarization phenomena in nuclear scattering, 10: 490

**Polonium**

- allotropy, x-ray-diffraction analysis, 10: 1428
- biological effects of, in rats, 10: 13
- biological half life in humans and biological effects on rats, 10: 12
- bone deposition and biological effects of, in rats, 10: 11
- crystal structure, 10: 1430
- effects on reticulo-endothelial system, 10: 1983
- electrochemical exchange with Ag, 10: 2257
- ion exchange, 10: 2334
- oxidation states in HNO<sub>3</sub>, 10: 2257
- radioautographic determination following intravenous injection into rats, 10: 2578
- radiometric determination, precision plating for, 10: 2974
- radiometric determination in urine, 10: 2278
- radiometric determination of, in samples of blood, urine, or feces, 10: 606
- spectrum and energy levels of, 10: 1618(J)
- tissue distribution and histopathological effects of, following intravenous injection into rats, 10: 2578
- tissue distribution following intratracheal administration in rats, tracer study, 10: 3260
- tissue distribution in rats, influence of sex, tracer study, 10: 3258
- tissue distribution of, in rats, 10: 556
- toxicity of, for laboratory animals, 10: 546(R)
- valence states of, 10: 1427
- x-ray spectra, 10: 1118

**Polonium alloys**

- crystal structure and preparation of binary, 10: 1429

**Polonium compounds**

- densities of characteristic, for valence states Po<sup>3+</sup> and Po<sup>4+</sup>, 10: 1427
- ionic radii of characteristic, for valence states Po<sup>3+</sup>, Po<sup>4+</sup>, 10: 1427

**Polonium isotopes Po<sup>206</sup>**

- electron-capture decay, 10: 3104

**Polonium isotopes Po<sup>208</sup>**

- electron capture-gamma decay, 10: 1729(R)
- gamma spectra and half lives of, in mixture with Po<sup>206</sup>, 10: 2195
- hyperfine spectrum analysis for nuclear spin, 10: 1537(J)

**Polonium isotopes Po<sup>209</sup>**

- electron capture-gamma decay, 10: 1729(R)
- gamma spectra and half lives of, in mixture with Po<sup>206</sup>, 10: 2195
- hyperfine spectrum analysis for nuclear spin, 10: 1537(J)

**Polonium isotopes Po<sup>210</sup>**

- metabolism in rats, influence of sex, 10: 3258
- metabolism of, administered by intratracheal injection to rats, 10: 3168
- packing fraction, disintegration, and gram atomic weight, 10: 3671
- radiometric and radioautographic determinations of, in biological materials, 10: 614
- separation from Pb<sup>210</sup> and Bi<sup>210</sup> by ion exchange, 10: 2798(J)
- tissue distribution following injection into rats, solution preparation, 10: 3099
- tissue distribution following oral administration in rats, effects of intramuscularly injected BAL, 10: 3259

- Polonium isotopes  $Po^{210}$  (cont'd)**  
toxicity following intratracheal administration to rats, 10: 3260
- Polonium isotopes  $Po^{212}$**   
energy levels, 10: 2938(J)
- Polonium isotopes  $Po^{214}$**   
energy levels and spin properties, 10: 1610(J)  
half life, method of measuring, 10: 1952(J)
- Polonium isotopes  $Po^{218}$**   
gamma spectra, 10: 1729(R)
- Polonium oxides**  
neutron emission from  $O^{18}(\alpha, n)$  reaction, 10: 3648
- Polonium sources**  
(See Alpha sources.)
- Polycrystals**  
scattering of x rays by, theory, 10: 429(J), 430(J)
- Polymerization**  
of methacrylic acid by x rays, 10: 1284(J)  
radiation induced, in vinyl compounds, 10: 1281  
radiation induced, study of, 10: 3143(R)  
of vinyl compounds, radiochemical, 10: 1282(J)
- Polymers**  
(See also specific polymers, e.g. Boron polymers; Styrene polymers.)  
effect of  $\beta$  radiation on conductivity, 10: 318(R)  
preparation and properties, 10: 1727(R)  
radiation effects, 10: 1283(J)  
radiation-induced deformation stress-strain curves for various reactor-irradiated, 10: 103(J)  
separation and identification of inorganic and semi-organic, 10: 54(R)  
synthesis and properties, 10: 2870(R)  
thermal diffusion of polystyrene in organic solvents, 10: 2621(J)
- Polyphenyls**  
analytical methods for determination of terphenyl, 10: 2258(R)  
classification of properties of, by punch-card methods, 10: 1333(R)  
synthesis, 10: 3603  
synthesis of hexylbiphenyls and heptylbiphenyls, 10: 1333(R)
- Polyphosphates**  
diffusion in aqueous solutions at 22°C, 10: 3777
- Polystyrene**  
(See Styrene polymers.)
- Polythene**  
(See Ethylene polymers.)
- Porous materials**  
heat transfer and transpiration cooling, 10: 124
- Portland cements**  
properties of, effects of elevated temperatures on, 10: 779
- Positrons**  
(See also Electrons.)  
annihilation in condensed materials, 10: 916(J)  
lifetime in superconducting elements, 10: 1411(R)  
scattering in nuclear emulsions, comparison with electrons, 10: 2192(J)  
transmission in Al, brass, Ag, Sn, Pb, and Au, 10: 1441(J)
- Potassium (cont'd)**  
spectrophotographic determination of, in sea water, 10: 1241  
spectrophotometric determination of small amounts of, in water, 10: 64  
surface tension in diluted-to-capacity amalgam of, 10: 602(J)
- Potassium borates**  
double decomposition in absence of solvents, 10: 596(J)
- Potassium borohydrides**  
proton magnetic resonance, 10: 2222(J)
- Potassium bromides**  
heat capacities of KBr and K(Cl, Br), mixed crystals, 10: 1255(J)
- Potassium chloride-aluminum chloride-lithium chloride-sodium chloride systems**  
phase studies, 10: 57
- Potassium chloride crystals**  
absorptive properties, 10: 3479
- Potassium chloride-lithium chloride systems**  
electrochemical properties and purification, 10: 2988
- Potassium chloride-sodium chloride-zirconium chloride systems**  
phase studies, 10: 578
- Potassium chloride-zirconium chloride systems**  
phase studies, 10: 578
- Potassium chlorides**  
analysis for Cs and Rb by radioactivation and ion exchange chromatography, 10: 1232  
annealing of radiation damage in, 10: 3368(R)  
electric conductivity of concentrated aqueous solutions of, at high temperatures, 10: 2620(J)  
heat capacities of (K, Na)Cl and K(Cl, Br) mixed crystals, 10: 1255(J)  
radiation effects on the properties of solid, 10: 1944(R)
- Potassium chromates**  
analytical uses of, in potentiometric titrimetric determination of U, 10: 2270  
distribution of Pb isotopes between solution and crystals of  $K_2CrO_4$ - $PbCrO_4$ - $H_2O$  systems, 10: 76(J)
- Potassium cyanocobaltates(III)**  
ion exchange separation from U, 10: 2689
- Potassium fluorides**  
phase studies, 10: 639(J)
- Potassium fluotitanate-sodium chloride systems (liquid)**  
electrolysis, mechanism of crystal growth from, 10: 2766(R)
- Potassium hydroxides**  
analysis for Cs and Rb by radioactivation and ion exchange chromatography, 10: 1232
- Potassium iodide crystals**  
emission of Tl-activated, effects of Tl concentration on, 10: 2114(J)  
light spectra effects on luminescence emission, 10: 2946(J)
- Potassium iodides**  
fast neutron detection with, dispersed in polystyrene, 10: 263(J)  
heat capacities of KI and K(Br, I) mixed crystals, 10: 1255(J)
- Potassium isotopes  $K^{39}$**   
energy levels, 10: 3329(R)  
energy levels, study by inelastic proton scattering, 10: 1506(R)
- Potassium isotopes  $K^{40}$**   
radiometric determination in man, 10: 2573(J)  
ratio of  $\Lambda^{40}$  to, in mica and feldspar, 10: 937(J)



**Potassium isotopes  $K^{41}$** 

body content, radiometric determination, 10: 3175

**Potassium isotopes  $K^{43}$** 

production by  $A^{48}(\alpha, pn)K^{43}$  reaction, 10: 2501(R)

radiometric determination in man, 10: 2573(J)

uptake by plants, scintillation detector for study of, 10: 255(J)

**Potassium isotopes  $K^{43}$** 

production by  $A^{48}(\alpha, p)K^{43}$  reaction, 10: 2501(R)

**Potassium-sodium alloys**

analysis for Cs and Rb by radioactivation and ion exchange chromatography, 10: 1232

analysis for  $O_2$ , 10: 2258(R)

**Potassium sulfates**

double decomposition in absence of solvents, 10: 596(J)

radium diffusion between the solution and crystals of, 10: 599(J)

**Potassium titanates**

phase studies, 10: 639(J)

**Potassium uranium(IV) fluorides**

preparation and electrolysis, 10: 1653(P)

**Potassium zirconium fluorides**

manufacturing processes in Auer plant, Berlin, 10: 145

**Potatoes**

irradiation of, portable plant for, 10: 519(J)

**Potentiometric analysis**

calculation of end points, 10: 2288

microtitration of weak acids in non-aqueous solvents for equivalent and molecular weight determinations, 10: 1244(J)

performance of Beckman automatic titrator for, 10: 3350

**Potosi Mine (Nev.)**

mineralogy, 10: 1358

**Pottsville Formation (Penna.)**

geology and coal deposits in, 10: 152

geology, radioactivity of coals and associated rocks in, 10: 2065

**Poultry**

(See Chickens.)

**Powder compacts**

density, length, and pressure, mathematical analysis, 10: 3287

dilatometer for study of densification of, 10: 925

**Powder metallurgy**

reactor materials fabricated by, 10: 1931(J)

for reactor uses, techniques and advantages, 10: 1409(J)

**Powders**

(See also specific powders, e.g. Aluminum powders; Beryllium powders.)

classification, single vane cyclone separator for, 10: 729(J)

radiant heat transfer, 10: 1342(R)

**Power breeder reactors**

(See also Power reactors.)

criticality studies of, design of zero power reactor experiment (ZPR-III) for, 10: 3226

design of Th-U<sup>233</sup>, 10: 3313(R)

neutron flux level effects on breeding ratio and critical size, 10: 3313(R)

**Power reactors**

economic fueling without U<sup>235</sup> enrichment, 10: 2164

**Power reactors (cont'd)**

electrochemical conversion of energy to electrical power, 10: 2510

fuel reprocessing methods, 10: 1923

physics, engineering, and economics of, popular lecture, 10: 1977

research on, summary, 10: 2168

review of suggested types, 10: 1551

**Power supplies**

(See also Accelerator tubes; Current regulators; Electric power; Voltage regulators.)

control of, transducer design for, 10: 921

design and circuits for, with constant-voltage output, 10: 1677(P)

design and operation of polyphase voltage generators, 10: 3062(P)

design and performance, for calutrons, 10: 3140

design for applications in reactor instrumentation, 10: 2467

design for spectrometer magnets, 10: 3206

design of transistor oscillator, for radiation detection instruments, 10: 3141

high-voltage alternating current, control circuit for, 10: 3066(P)

low-voltage, design, 10: 1688(P)

mercury-arc converters for proton-synchrotron, 10: 408

**PPA**

(See KAPL Intermediate Power Breeder Critical Experiments.)

**Praseodymium**

(See also Rare earths.)

allotropic forms, transition temperatures, and lattice constants, 10: 569(R)

cathode-luminescence spectra of, in various forms of alumina, three prototypes for, 10: 2944(J)

hyperfine structure and nuclear magnetic moment, 10: 480(J)

spectrum analysis by echelle spectrograms, 10: 3309(R)

**Praseodymium chlorides**

polarization spectra, 10: 1612(J)

**Praseodymium fluorides**

absorption spectra, 10: 1613(J)

preparation of  $PrF_4$ , 10: 3271

**Praseodymium hydrides**

crystal structure, 10: 2034(J)

**Praseodymium-hydrogen systems**

phase studies, 10: 2033(J)

**Praseodymium ions**

absorption spectra and quantum states, 10: 1612(J), 1613(J)

**Praseodymium isotopes  $Pr^{142}$** 

beta- $\alpha$  directional correlations, 10: 3367(R)

neutron activation cross section and decay curve, 10: 2449(R)

neutron activation cross sections, 10: 1614(J)

**Praseodymium isotopes  $Pr^{143}$** 

bremsstrahlung spectrum, 10: 1950(J)

decay curve, 10: 2449(R)

**Precipitation**

from homogeneous solutions, theory and application to liquid-solid distribution studies, 10: 731(J)

**Preferred orientation**

proportionality constant in, internal standard for determination of, 10: 2457

**Pressure**

(See also Pressure gages; Pressure vessels; Pumps; Seals and glands; Valves; Vapor pressure.)

- Pressure (cont'd)**  
 effects on radioactive half lives, 10: 476(J)  
 measurement, for HF storage tank content, 10: 924
- Pressure drop**  
 (See also Fluid flow; Gas flow; Liquid flow.)  
 theory, 10: 2693  
 for two-phase, two-component flow, 10: 769(J)
- Pressure gages**  
 (See also Manometers.)  
 design, for liquid H<sub>2</sub> bubble chambers, 10: 3204  
 high temperature, design of remote indicating, 10: 2789
- Pressure vessels**  
 design for pressurized water reactors, 10: 2163  
 design theories, intercomparison, 10: 2050(J)  
 stress analysis of circular plates, 10: 888  
 stresses from radial loads and external moments in cylindrical, 10: 1777(J)  
 temperature fields in, effect of pressure on, 10: 766(J)  
 thermal and pressure stresses and determination of optimum thickness, 10: 1927
- Pressurized water reactors**  
 fission product (gaseous) distribution in, from fuel element failures, 10: 1562  
 hazards from fission product heat in accident to, 10: 2167  
 pressure vessels, feasibility study, 10: 2163
- Princeton Univ., N. J.**  
 progress reports on hydrogen exchange reactions, 10: 2305(R)
- Promethium isotopes Pm<sup>147</sup>**  
 bremsstrahlung spectrum, 10: 1950(J)  
 decay, bremsstrahlung radiation and autoionization in K level, 10: 1951(J)  
 source preparation by electroplating, 10: 1608(J)
- Propane**  
 mass spectrographic analysis, 10: 3026(R)  
 mass spectrum and metastable ions from 2,2 dideutero-, 10: 886  
 physical properties of SF<sub>6</sub>-propane system, 10: 1263(J)
- Propane, 1-chloro-**  
 chemical reaction with GaCl<sub>3</sub>, 10: 2012(J)
- Propane, 2-chloro-**  
 chemical reaction with GaCl<sub>3</sub>, 10: 2012(J)
- Propane, 2-chloro-2-methyl-**  
 chemical reaction with GaCl<sub>3</sub>, 10: 2012(J)
- 1-Propanol**  
 tritium-labeled, chromic acid oxidation, isotope effects, 10: 935(J)
- Propanol, 2,3-dimercapto-**  
 effects of intramuscularly injected, on tissue distribution of orally administered Po<sup>210</sup> in rats, 10: 3259
- Propene**  
 hydrogenation, kinetics, 10: 1334(J)
- Propene, hexachloro-**  
 chemical reactions with metallic oxides, 10: 3546  
 reactions with UO<sub>3</sub>, 10: 3569
- Propionic acid, α-amino-**  
 (See Alanine.)
- Propiophenone, p-amino-**  
 protective action from x-radiation effects on rats, 10: 1167
- Proportional detectors**  
 alpha, improved designs for, using air, 10: 2118(J)  
 beta activity measurement with, 10: 1885(J)  
 calibration for α counting, 10: 3375  
 counting losses in BF<sub>3</sub>, used in BNL Reactor startup, 10: 3213  
 design for neutron spectroscopy, 10: 965(J)  
 design of BF<sub>3</sub>-filled, for use with neutron velocity selector, 10: 3299  
 design of high yield, 10: 3649(R)  
 design of multiple-wire, 10: 1877(J)  
 design of neutron, 10: 3638  
 design of recoil-type, for detecting neutrons, 10: 250  
 end effect, method for eliminating, 10: 1878(J)  
 operation at high temperatures, 10: 964(J)  
 performance for neutron dosimetry, 10: 2816  
 pulse size distribution from monoenergetic radiation in, 10: 2832(J)  
 resolution, improvement by a graphite cathode liner, 10: 2122(J)  
 self-absorption and window-absorption corrections for fission product detection, 10: 248  
 tritium assay by, 10: 973(J)
- Protactinium**  
 radiometric determination in ore samples, 10: 81(R)  
 radiometric determination of, in samples of blood, urine, or feces, 10: 606  
 separation from alloys of irradiated Th in Bi, 10: 2440(R)  
 separation from Th, and distribution between Bi and Al, 10: 2518(R)
- Protactinium compounds**  
 chemical properties, 10: 3416
- Protactinium isotopes Pa<sup>230</sup>**  
 beta decay, γ transitions in, 10: 1114(J)
- Protactinium isotopes Pa<sup>231</sup>**  
 alpha spectra, 10: 1729(R)  
 alpha spectrum, measurement, 10: 336(J)  
 metastable states, 10: 1524(J)
- Protactinium isotopes Pa<sup>233</sup>**  
 determination in fission products, 10: 1230  
 electron spectrum, 10: 3649(R)  
 measurements on the electron spectrum, 10: 1112(J)  
 neutron absorption cross section, 10: 1907
- Protactinium isotopes Pa<sup>234</sup>**  
 beta-γ coincidences and decay scheme, 10: 2933(J)
- Protective clothing**  
 decontamination, effectiveness of decontaminating solutions, 10: 3003  
 of plastics, effectiveness as radiation protection, 10: 2247
- Proteins**  
 (See also Lipoproteins.)  
 blood plasma, effects of radiation on, in chickens, 10: 2575  
 determination in urine from nephrotic patients, 10: 2636(J)  
 effects of radiation, 10: 2576  
 fractionation and sedimentation, 10: 3165(R)  
 irradiated, paramagnetic resonance, 10: 1308(J)  
 labeled with I<sup>131</sup>, effects of x irradiation, 10: 2608(J)  
 radiation effects, 10: 1696(R)  
 sorption and orientation properties of, 10: 507  
 synthesis in rat pancreas and liver, and in yeast, 10: 3327(R)

**Proton beams**

- current measurement of 60-kev, instrumentation for, 10: 2503
- focusing, in linear accelerators, 10: 1075
- space charge effects during diffusion, 10: 3019(J)
- synchrotrons injection scheme for, 10: 1078

**Proton cross sections**

- Bismuth W, U, for 460, 660 Mev, 10: 1071(J)
- calculations for various elements, 10: 1507(R)
- for  $C^{12}(p,pn)$  reaction with 200 to 950 Mev protons, 10: 1569(J)
- measurement in  $(p,\gamma)$  reactions, 10: 402(J)

**Proton scattering cross sections**

- measurement of 30-Mev elastic, for Al, Cu, Ag, Ta, Au, Pb, 10: 3241
- of protons, from 150 to 340 Mev, 10: 1090

**Proton spectrometers**

- design of a  $180^\circ$  point-focusing magnetic, 10: 963(J)
- design of magnetic, for neutron energy measurement by recoil proton determinations, 10: 3746

**Proton synchrotrons**

- beam deflection scheme for, 10: 1078
- magnet, supply voltages for, 10: 1077

**Proton total cross sections**

- determination in the energy interval 410 to 660 Mev, 10: 333(J)

**Protons**

(See also Antiprotons; Cosmic protons; Photoprotons.)

- acceleration, design of cavity resonator for, 10: 2904
- alpha particle emission after bombardment with 1000-Mev, 10: 424(J)
- angular distribution in n-p scattering at 17.9 Mev, 10: 433(J)
- detection and measurement, spectrometer design for recoil, 10: 3746
- detection and measurement by CsI(Tl) crystals, 10: 2844(J)
- elastic scattering of 30-Mev, by Al, Cu, Ag, and Au, 10: 1009(R)
- elastic scattering of 30-Mev, by Al, Cu, Ag, Ta, Au, Pb, 10: 3241
- electron capture by, cross sections for, 10: 3144(R)
- electron-capture cross section for, passing through gases, 10: 320(R)
- energy distribution, from  $(\alpha,p)$  reaction in Au, Ag, and Cu, 10: 2175(J)
- fission product distribution curves from  $U^{238}$  bombardment, and fission cross sections, 10: 2240(J)
- gamma scattering at 100 to 145 Mev, 10: 3222(R)
- interactions with protons at 3 Bev, 10: 1594(J)
- ionization in nuclear emulsions, measurement, 10: 268(J)
- losses and scattering by residual gases in synchrotrons, 10: 2905(J)
- magnetic field measurements by resonances, 10: 2466
- magnetic moment spatial extension, calculation from hyperfine structure of H, 10: 368(J)
- magnetic resonance, between 2 and 0.5 Gauss, 10: 2875(J)
- magnetic resonance in ethyl alcohol, 10: 201
- mass difference relative to neutron, 10: 1506(R)
- meson (K) scattering by, from 10 to 6000 Mev, tables of data on, 10: 3303
- mesons ( $\pi$ ) scattered by, Coulomb interference in, 10: 982(J)
- mesons ( $\pi$ ) scattered by, phase shifts for, 10: 981(J)
- neutron scattering, 10: 2496
- neutron scattering, theory, 10: 2499
- nuclear reactions at energies up to 6 Bev, 10: 3104
- nuclear reactions (p,d), contribution of deuteron stripping to collision matrix, 10: 393(J)
- $\pi$ -meson scattering by, use of dispersion relations in analyzing data, 10: 435(J)

**Protons (cont'd)**

- pion scattering phase shifts, analysis, 10: 3153
- pions scattered by, phase shift analysis of, at 187 Mev, 10: 370(J)
- polarization of, by proton scattering, 10: 334(J)
- polarization of, scattered by Fe, 10: 2912(J)
- polarization of 130-Mev, elastically scattered from nuclei, 10: 1593(J)
- potential of neutron-proton system and deuteron photodisintegration, 10: 1966(J)
- proton-proton and proton-neutron scattering cross sections, 10: 321(J)
- proton reactions, total cross sections in energy interval 410 to 660 Mev, 10: 1091(J)
- proton scattering by, at 15 Mev, 10: 3862
- proton scattering by, phase shifts in, 10: 426(J)
- rare earth nuclei excitation by, 10: 1611(J)
- reactions with H, energy losses in, 10: 1093(J)
- scattering, asymmetries in quasi-elastic, 10: 1939
- scattering, elastic p-p, 10: 3222(R)
- scattering, energy dependence of polarization in, 10: 3047
- scattering by 1.4-Bev  $\pi$  mesons, phenomenological analysis of, 10: 2855(J)
- scattering by protons, phase analysis of, 10: 2188(J), 3242(J)
- scattering by protons at 170 Mev, polarization, 10: 2191(J)
- scattering by protons from 150 to 340 Mev, 10: 1090
- scattering in inert gases, approximation of high order phase shifts in, 10: 427(J)
- scattering of 19-Mev, by  $O^{16}$ , and  $O^{16}$  energy levels, 10: 2160(J)
- stars produced in nuclear emulsions by 1000-Mev, characteristics of, 10: 907(J)
- stopping powers of metals for 20-Mev, 10: 1092(J)
- survey of (p,n) reactions, in 20 elements at 12 Mev, 10: 2152(J)
- trajectories in accelerating and drift spaces in injector for linear accelerator, 10: 2903
- tritium reactions (p,n) at 1 to 7 Mev, 10: 3152(J)

**Psychology**

- adaptive behavior, 10: 1729(R)

**Pulmonary absorption**

- of particulate material, measuring apparatus, 10: 1982
- of radioactive materials, buildings and facilities for research programs, 10: 1776

**Pulse analyzers**

(See also Oscillographs.)

- design, 10: 1450(J)
- design of high sensitivity, 10: 2791(J)
- 120-channel, characteristics, 10: 3023(R)
- for separating pulses of different amplitude for simultaneous measuring of  $\alpha$  and  $\beta$  particles, 10: 1674(P)
- time interval-pulse converter for use with, 10: 3144(R)

**Pulse generators (electronics)**

- design, for  $\mu$ sec neutron pulse production, 10: 3159
- design and performance, 10: 1670(P)

**Pulse transformers**

- design criteria and data for high power-high voltage pulse, 10: 756

**Pumps**

(See also specific types of pumps, e.g. Electromagnetic pumps; Vacuum pumps.)

- design of totally-enclosed water, 10: 2406
- mechanical boosters theory and performance, and rotary gas ballast, 10: 1833(J)



**Pumps (liquid metal)**

design, 10: 1775(R)

design of electromagnetic, 10: 1660(P)

design of electromagnetic induction type, 10: 120(R)

**Purdue Univ., Lafayette, Ind.**

progress reports on fluorocarbon research, 10: 2310(R)

**Purex Process**

analysis of dissolver off-gas for nitrogen tetroxide, 10: 2287(R)

analytical control, preparation of  $\beta$  mounts from uranyl nitrate solutions, 10: 2375

decontamination, 10: 3488(R)

decontamination reagent for stainless steel, 10: 3489(R)

electrolytic decontamination of equipment, adjustment of solutions, and Pu isolation, 10: 2329(R)

solvents, vapor pressure, 10: 3487

specific heat of organic solvents and diluents, 10: 2663

**Purine, 6-amino-**(See Adénine.)**PWR**(See Pressurized water reactors.)**Pyrometers**

pyrolysis coils, design problems, 10: 769(J)

**Pyrophosphoric acid**

ion exchange for U recovery, 10: 689(R)

**Pyrophosphoric acid, alkyl esters**

preparation and properties, 10: 685(R)

**Pyrrolidone, vinyl- polymers**

protective effects against radiation injuries in rats, 10: 1996(J)

**Q****Quantum electrodynamics**(See also Field theory; Quantum mechanics.)

development, review, 10: 1974(J)

elimination of divergences in scattering matrix, theory, 10: 1628(J)

energy levels of helium-like atoms, 10: 1132(J)

formulation in terms of gauge-invariant dynamical variables, 10: 1625(J)

Green's electron function in, asymptotic appearance of, 10: 2110(J)

re-normalized charge in, zero equality, 10: 2949(J)

**Quantum mechanics**(See also Mathematics; Physics; Quantum electrodynamics.)

Coulomb excitation calculation, 10: 363(J)

field theory with causal operators and Schwinger's function, 10: 945(J)

kinetic equation for multiple scattering, 10: 2189(J)

limits of application of, by measurement of electron moment, 10: 2809(J)

operator formalism in perturbation theory of, 10: 1130

physical interpretation of De Broglie equations in, 10: 2959(J)

self-acceleration of particles treated by, 10: 2963(J)

for theory of crystals at low temperature, 10: 1629(J)

theory of new unstable particles, 10: 495(J)

theory of quantum statistics, 10: 488

**Quantum physics**(See Nuclear physics.)**Quartz**(See also Silicon oxides.)

adsorption and solubility of, 10: 1781(R)

electrokinetic potentials in dodecylamine solutions, 10: 1229(J)

neutron scattering, 10: 3655

paramagnetic centers in MTR-irradiated, 10: 3035(R)

radiation effects, 10: 2977

solubility in water, 10: 3189(R)

**8-Quinolinol**

coulometric determination, 10: 3437

**8-Quinolinol chelates**

with Al, preparation, spectra, thermal stability, and polymerization, 10: 64(R)

**R****R. H. D. Claim (Colo.)**

geology, mineralogy, and U occurrence, 10: 1363(J)

**Rabbits**

lens opacities produced by microwaves, 10: 1173(J)

**Radiation**(See also specific types of radiation, e.g. Gamma radiation; X radiation.)

bacteremia induced by exposure to, in mice, 10: 1185(J), 1186(J)

bacteremia induced by exposure to, in mice, effects of antibiotic therapy, 10: 1187(J)

biological effects, factors affecting determinations on, 10: 2586(J)

biological effects of, book, 10: 38(J)

biological effects of, quantitative methods for determining, 10: 15

biological effects of low-level on ecology of Columbia River, 10: 2595(J)

biological effects of penetrating, 10: 2582(J)

biological effects on mice, guinea pigs, rabbits, goats, and man, 10: 3408(R)

carcinogenetic effects of, in rats, 10: 1(R)

carcinogenetic effects of, review, 10: 1180(J)

cutaneous effects of contact with radioactive particles in swine, 10: 2242(R)

detection and measurement by photographic recording of fluorescence, 10: 3214(J)

detection and measuring equipment, handbook on, 10: 954

diffusion, non-steady processes of, theory, 10: 2908(J)

dosage determinations, 10: 3030

dosage determinations of, for guinea pigs, 10: 514

dosage determinations of, for workers in the fields of radiotherapy and nuclear physics, 10: 543(J)

effects of exposure on salamander embryos, 10: 2591(J)

effects of exposure to, on food and applications in the sterilization of food, 10: 18

effects of exposure to, on food and applications in the sterilization of food, bibliography, 10: 17

effects of total-body exposure to, on water and electrolyte balance in various tissues of dogs, 10: 26(J)

effects on animal and plant cells and intact mice and rats, 10: 1168(R)

effects on behavior of monkeys, 10: 1166

effects on immunochemical and physicochemical factors in serum proteins of rats, 10: 2576

effects on ultraviolet and infrared spectra of albumin, 10: 525(J)

## Radiation (cont'd)

- electrochemical conversion of reactor energy to electrical power, 10: 2510
- from fall-out from thermonuclear explosions, pathological effects, 10: 16
- genetic effects, 10: 2590(J), 3093
- geometrical corrections for anisotropically emitted, 10: 3212
- high-energy interaction with matter, effects on results of radiobiological studies of, 10: 27(J)
- from iodine<sup>131</sup>, pathological effects on rat pituitary glands, 10: 3251
- mutations induced by exposure to, in *Paramecium*, role of H<sub>2</sub>O<sub>2</sub>, 10: 1986(J)
- pasteurization of meat induced by exposure to, design of facility, 10: 2579
- pathological effects, from I<sup>131</sup> on thyroid gland in sheep, 10: 1163
- pathological effects of, on cells, factors affecting, 10: 517
- pathological effects of injected Pu, Ra<sup>226</sup>, Ra<sup>228</sup>, and Th<sup>232</sup> in dogs, 10: 1160(R)
- penetration into semi-infinite slabs, comparison of diffusion and transport theories, 10: 1085
- sterilization and food deterioration following exposure to, 10: 515
- sterilization of foodstuffs by exposure to, 10: 29(J)
- tables of F coefficients for angular correlations, 10: 1008
- units of measurement and dosage determinations, 10: 1706(J)

## Radiation chemistry

- of amino acids, 10: 2029(J)
- conjugated reactions in aqueous solutions, 10: 652(J)
- of cysteamine and cystamine labeled with S<sup>35</sup> in aqueous solutions, 10: 1275(J)
- degradation of cystamine, 10: 2028(J)
- of formic acid-ferrous sulfate system, 10: 1273(J)
- of hydrazine in aqueous solutions, 10: 1272(J)
- molecular excitation and dissociation by  $\beta$  decay, 10: 2653(J)
- radical yields from cathode-ray oxidation of FeSO<sub>4</sub> solution, 10: 2654(J)
- radiolysis and photolysis of DPPH, 10: 1729(R)
- review, 10: 3179
- syntheses produced by x rays, 10: 1277(J)
- of water, effect of Br<sup>-</sup> on peroxide yield in, 10: 1274(J)

## Radiation damage

(See also Radiation injuries.)

- on glycogen processes in animals exposed to x rays, 10: 533(J)
- of organic liquids, loop testing facility in MTR, 10: 2026

## Radiation detection instruments

(See also Radiation detectors; Rate meters; Scalers.)

- for alpha counting, calibration and operation, 10: 2112
- anthracene counter for meson counting, development, 10: 2488
- calibration, design, and operation, 10: 954
- calibration of, for x-ray dosimetry, 10: 1880(J)
- design and performance for reactor instrumentation, 10: 2487
- design and performance requirements of, for NATO countries, 10: 259(J)
- design of, for use as dosimeters, 10: 42(R)
- design of high-threshold scintillation detector for neutrons, 10: 2818(J)
- disintegration rate determination by 4 $\pi$  beta counting, 10: 977(J)
- ionization chambers, field distortion in, 10: 2118(J)
- luminescent media for recording tracks of ionizing particles, use of multigrid electron-optic tubes with, 10: 2819(J)
- neutron time-of-flight analyzer, design, 10: 1(R)
- performance of, for neutron dosimetry, 10: 957

## Radiation detection instruments (cont'd)

- proton velocity selector for cosmic-ray studies, 10: 1847(J)

## Radiation detection instruments (colorimetric)

- calibration of anthracene crystals for neutron dosimetry, 10: 951
- design of scintillation-type ion detectors, 10: 1687(P)
- megaroentgen dosimeter system using cobalt or silver glass, performance, 10: 2829(J)

## Radiation detection instruments (ion current type)

- beta- $\gamma$  probe design for use with Samson survey meters, 10: 3374
- design, 10: 2813
- design of proportional fission neutron counters, 10: 3638
- electroscope design, self-recording, for 10<sup>-14</sup> amp range, 10: 1480(J)
- extrapolation chamber for measurement of  $\beta$  surface dose from U, 10: 2480
- half-life measurements by, 10: 1474(J)
- performance of ion-chamber-type pocket dosimeters, 10: 952
- radioelectric cell operation as, 10: 3300

## Radiation detection instruments (pulse type)

- alternating-frequency type, design, 10: 2821(J)
- beta-gamma hand and foot monitor, design, 10: 3373
- calibration, 10: 3034(R)
- calibration of, for high-energy  $\gamma$  dosimetry, 10: 1464
- design, employing liquid scintillation detectors, photomultiplier, and coincidence circuit, 10: 3104
- design, to detect low-level  $\gamma$  activity in humans and large samples, 10: 2825(J)
- design for detection of x rays, 10: 1469(J)
- design for fast neutrons, 10: 950
- design of ion chambers for radiometric analysis of man, 10: 258(J)
- design of portable reader for DT-60 dosimeters, 10: 2815
- design of portable scintillation counter for  $\alpha$ ,  $\beta$ , and  $\gamma$  activities, 10: 3080(P)
- fission product monitors at MTR, 10: 3147
- having proportional detector and pulse integrator, calibration for neutron dosimetry, 10: 2816
- modifications in a Geiger counter for C<sup>14</sup> counting, 10: 2115(J)
- monitor for radioactive ore, 10: 1465
- neutron, geometry, 10: 2485
- neutron BF<sub>3</sub> detector, design, 10: 3658
- operation of fast-neutron dosimeters in high  $\gamma$  fields, 10: 256(J)
- preparation of bone samples, 10: 1161(R)
- operation of proportional counters at high temperature, 10: 964(J)
- performance, effect of line filters, 10: 2484
- performance in  $\beta$  counting, 10: 1462
- performance for  $\alpha$  counting, 10: 3375
- performance of, having scintillation detector and photographic pulse height analyzer, 10: 2814
- performance of, in measuring total radioactivity from the human body, 10: 946
- performance of crystal counter in neutron field of synchrocyclotron, 10: 2453
- performance of Samson survey meter for  $\gamma$  detection, 10: 3639
- portable, employing G-M tubes, operation, 10: 2487
- portable neutron scattering meter for soil moisture determination, 10: 2845(J)
- power supply, transistor oscillator, 10: 3141
- resolution and performance of scintillation counters, 10: 257(J)

## Radiation detection instruments (pulse type) (cont'd)

- response of scintillators and Cherenkov radiators to gamma radiation, 10: 3023(R)
- scintillation counter employing automatic sample alternation for assay of  $C^{14}$  compounds, 10: 1874(J)
- scintillation spectrometer for isotope uptake measurements, 10: 972(J)
- sensitivity loss determinations, 10: 1411(R)

## Radiation detectors

(See also specific detectors, e.g. Cloud chambers; Crystal detectors.)

- design and operation of sulfur crystal counters, 10: 1680(P)
- electrical switchgear for, design, 10: 1669(P)
- for fast neutrons, Tl-activated KI, 10: 263(J)
- glass-ball non-electrical, design and theory, 10: 3090(P)
- polymethyl methacrylate and polystyrene used for, 10: 1478(J)
- portable, design and operation, 10: 3086(P)
- pulse height discriminator for simultaneous measurement of  $\alpha$  and  $\beta$  particles, 10: 1674(P)
- scintillation spectrometers, resolving ability, 10: 253(J)

## Radiation effects

- on carbohydrate exchange in animal organs, 10: 1175(J)
- crystal structure changes in diamond from neutron irradiation, 10: 3745(R)
- on food, 10: 18
- on food, bibliography, 10: 17
- in graphite and metals, cyclotron applications, 10: 3322
- inhibitor breakdown in ZnBr shielding windows, 10: 444(J)
- on mammals, bibliography, 10: 15
- in metals, survey, 10: 1410(J)
- on polymers, deformation mechanisms of, 10: 103(J)
- protective action of chemical agents from, on rats, 10: 1167
- statistical analysis of biological studies, 10: 3166
- of ultraviolet and x rays on albumin solutions, 10: 534(J)

## Radiation exposure chambers

- effects of confinement in, on food and water consumption in rats, 10: 21

## Radiation injuries

(See also Radiation damage; Radiation sickness.)

- in animal organism effect of radiation intensity on, 10: 25(J)
- of chromosomes in onion root tips, protective effects conferred by sodium hydrosulfite and BAL, 10: 1197(J)
- determination by spleen-thymus weight in adrenalectomized rats and mice, 10: 1987(J)
- effects of kidney shielding in rats, 10: 1699(J), 1700(J)
- effects of low-body temperature on, in rats, 10: 541(J)
- effects of splenic plasma on, in rabbits, 10: 516(R)
- effects of temperature and altitude on, in rats, 10: 536(R)
- following radium and thorium exposure, 10: 2597(J)
- of gastrointestinal tract, effects of shielding on, 10: 1697
- induced by chronic exposure to  $I^{131}$  in sheep, 10: 2577
- to lungs, from radioactive barium sulfate dust, 10: 1698(J)
- of lungs in rats, effects of cortisone, 10: 3166
- prophylaxis, in microorganisms and mice, 10: 1168(R)
- protection afforded by lead screens and by injections of mercapto-ethylamine against, in rats, 10: 532(J)
- protective effects of amines against, 10: 1995(J)
- protective effects of anoxia and cysteamine against, in rabbit's ear, 10: 1196(J)

## Radiation injuries (cont'd)

- protective effects of carbon monoxide against, in guinea pigs, rats, and rabbits, 10: 44(J)
- protective effects of cysteamine, cystamine, and hypoxia against, in mice, 10: 540(J)
- protective effects of cysteinamine in fetal mice, 10: 1998(J)
- protective effects of injected bone marrow against, 10: 537
- protective effects of periston in rats, 10: 1996(J)
- protective effects of spleen homogenates and aminopterin against, in mice, 10: 1161(R)
- protective effects of streptomycin and marrow-spleen homogenates in hamsters, 10: 1191(J)
- repression and enhancement of, by metabolic poisons and oxygen, in grasshopper embryos, 10: 45(J)
- in silkworms, effects of cysteine and mercaptoethylamine, 10: 1999(J)
- of skin, protective effects of injected tissue homogenates in rats, 10: 2594(J)
- therapeutic and prophylactic agents against, evaluation of six substituted amines, two isothiourae derivatives, and anti-metabolites as, in mice, 10: 536(R)
- therapeutic effects of injected bone marrow on, in rats, 10: 1997(J)
- therapeutic effects of vitamin fortified antibiotics in dogs, 10: 3255
- therapy with bone marrow injections, effects of intestinal, spleen, and leg shielding on, in rats and mice, 10: 1189

## Radiation monitoring

- activities at Hanford, 10: 2242(R)
- beta-gamma hand and foot, instrumentation, 10: 3373
- with blood counts, 10: 1707(J)
- computation of radiation hazards, 10: 3030
- research at Hanford, 10: 3409(R)
- of uranium ore, instrumentation, 10: 1465
- of waste material before marine burial, 10: 755(J)

## Radiation protection

(See also Health physics; Radiation detection instruments; Remote-control equipment; Shielding.)

- from  $Al \gamma$  rays, 10: 1100
- in the atomic energy industry, a summary, 10: 1713(J)
- during firefighting where radioactivity is a factor, 10: 535
- exposure limits, 10: 1706(J)
- film badge calibration curve, 10: 974(J)
- in hospitals, 10: 1712(J)
- personnel meter, design of non-electrical, 10: 3090(P)
- portable radiation monitor for, design, 10: 3086(P)
- rules and regulations for hot laboratories, 10: 3412
- safe handling of radioisotopes for diagnostic and therapeutic uses, 10: 1199(J)
- shielding blocks for hot laboratories, construction, 10: 1686(P)
- of telecobalt installation personnel, 10: 1711(J)
- in a university, 10: 1710(J)
- of x-ray workers and patients, 10: 1709(J)

## Radiation Research Corp., West Palm Beach, Fla.

- progress reports on nuclear batteries, 10: 318(R)

## Radiation shielding

(See Shielding.)

## Radiation sickness

(See also Radiation injuries.)

- effects of ACTH on, 10: 538(J)
- pathogenesis, 10: 2598(J)



## Radiation sickness (cont'd)

plasma electrophoretic pattern in lethal human case, 10: 3408(R)

## Radiation sources

(See also Radioapplicators.)

geometric corrections for anisotropic emission, 10: 3212

potato irradiation by portable, 10: 519(J)

## Radiation target cans

(See also Slug cans.)

aluminum casings for Hanford special requests, closures for, 10: 2539

## Radicals

formation in liquids by ionizing radiation, 10: 441(J)

## Radio waves

(See also Microwaves.)

propagation in the ionosphere, theory, 10: 1841(J)

## Radioactive contamination

(See also Decontamination; Stack disposal; Waste disposal.)

air-borne, resulting from transferable contamination on surfaces, 10: 1994

of concretes, countermeasures, 10: 779

control of airborne, evaluation of soil surfaces for, 10: 1695

countermeasures for use in industry, 10: 1713(J)

protection afforded by plastics, 10: 2247

## Radioactive materials

density measurements on, equipment, 10: 2048

handling, problems and costs encountered in, 10: 3244

handling, sealing, and storage of irradiated wire specimens, 10: 173

handling and machining equipment, 10: 2024

handling in peacetime applications, public health aspects, 10: 2596(J)

lung deposition following smoking with contaminated hands, 10: 1703

mass transfer from irradiated stainless steel by liquid Na, measurement of, 10: 3368(R)

production in nuclear reactors, 10: 3709

pulmonary absorption, buildings and facilities for research program, 10: 1776

weighing micro-amounts of, design of balance for, 10: 645

x-ray-diffraction analysis, 10: 2124(J)

## Radioactive minerals

nuclear emulsions for study of, 10: 2833(J)

## Radioactive minerals (Calif.)

occurrence in Rock Corral Area, 10: 161(J)

## Radioapplicators

(See also Radiation sources.)

design, for intravaginal Au<sup>198</sup> application, 10: 1198(J)

## Radioautography

(See also Nuclear emulsions; Photographic film detectors; Radiography.)

sample preparation of lung tissue for, 10: 1203

## Radiobiology

biochemical phenomena in, conference, 10: 39(J)

book, 10: 38(J)

instruments and techniques for studies on, 10: 513(R)

interaction of high-energy radiations with matter in studies on, 10: 27(J)

proceedings of the Liege 1954 symposium, 10: 524(J)

## Radiochemical processing plants

capacity, fission-product-activity build-up, and waste disposal, calculations, 10: 3248

## Radiochemical processing plants (cont'd)

instrument manuals, 10: 3475

remote-control equipment for, design, 10: 2462

## Radiochemistry

chemical separation techniques for Na, P, Sc, Mn, Ag, Ba, and Ir, 10: 1208(R)

laboratory design for university research in, 10: 646(J)

manual of analytical procedures for fission-product determination, 10: 3267

manual of radiochemical techniques, 10: 2626

periscope system for remote operations, 10: 647(J)

principles and problems, book, 10: 653(J)

## Radiodermatitis

following exposure to fall-out from thermonuclear explosion, 10: 16

## Radioelectric cells

(See also Radiation detection instruments (ion current type).)

use as a radiation detection instrument, 10: 3300

## Radiofrequency generators

design, for cloverleaf cyclotrons, 10: 1082

## Radiography

(See also Photographic film detectors; Radioautography.)

applications of Tm<sup>170</sup> in, 10: 2599(J)

## Radioisotopes

(See also Fission products.)

analysis of mixtures of, using  $\beta$ - $\gamma$  scintillation spectrometers, 10: 3637

fixation by algae and bacteria in oxidation ponds, 10: 3101

General Motors laboratory, 10: 207(J)

half-life measurements, cinemucleography applied to, 10: 1952(J)

half-life measurements by square wave activation, 10: 320(R)

half lives, effects of pressure on, 10: 476(J)

half lives, technique for accurate measurement, 10: 1474(J)

induced in reactor cooling water, measurement of, 10: 385(J)

for medical uses, safe handling, 10: 1199(J)

mutation in plants and animals induced by, 10: 3169

production and analysis at ORNL, 10: 3266

production separations of fission product groups, 10: 3025

protection measures for use in hospitals, 10: 1712(J)

protection measures for use in university experiments, 10: 1710(J)

spectrographic analysis, design and operation of furnace for, 10: 486(J)

technological use of, review, 10: 1835(J)

therapeutic applications, 10: 2603(J)

therapeutic uses, 10: 2000(J)

## Radiological defense

passive defense measures for naval shore establishments, 10: 503

## Radiology

conferences on, 10: 46(J)

depth dosage determinations, 10: 1881(J)

dosage determinations, 10: 1882(J), 1883(J)

radiation hazards to diagnostic workers, 10: 1708(J), 1709(J)

## Radiometric analysis

of blood, urine, and feces, for  $\alpha$  activity, sample preparation, 10: 606

counting equipment for, 10: 3175

of fission products adsorbed on soil, sample preparation, 10: 1240

manuals for fission products, 10: 3267

## Radiometric analysis (cont'd)

- of radionuclide mixtures using  $\beta$ - $\gamma$  scintillation spectrometers, 10: 3637
- of uranyl nitrate solutions, 10: 2375
- of urine, sample preparation, 10: 2278

## Radiosensitivity

- of adrenal glands in rats, measured by ascorbic acid depletion and histologic alterations in rats, 10: 1174(J)
- of *B. subtilis*, environmental conditions affecting, 10: 1194(J)
- of barley seed, effects of hydration, 10: 1195(J)
- to betatron x rays and electrons in rats, 10: 1985(J)
- effect of leukocyte count in mice, 10: 2574
- effects of morphine and N-allylnormorphine on, in mice, 10: 1705(J)
- of mammalian cells, effects of oxygen concentration, 10: 2585(J)
- oxygen factors affecting, in *Ascaris* eggs, 10: 2587(J)
- of seed, effects of hydration, 10: 1192(J)
- of skin, effects of anoxia and temperature, 10: 1190(J)

## Radiosterilization

- of food, combined with temperature control, theory, cost factors, and effects on storage life, 10: 1162
- of meat, by  $\gamma$  irradiation, 10: 1170

## Radiotherapy

- applications of radioisotopes, 10: 2000(J)
- cesium 137 teletherapy unit for, design, 10: 2002(J)
- a cobalt-60 revolving therapy unit for, design, 10: 48(J)
- cobalt<sup>60</sup> teletherapy unit for, design, 10: 2003(J), 2004(J)
- developments in, discussions at Copenhagen radiology conference on, 10: 46(J)
- dosage determinations for, radiological units, 10: 1883(J)
- dosage determinations of fractionated  $\beta$  and x radiation for, 10: 2604(J)
- dosage determinations on betatron rays, 10: 2001(J)
- equipment design for "in vivo" localization of radioactive bodies, 10: 1476(J)
- isodose curves for cobalt<sup>60</sup> hectocurie teletherapy machine, 10: 544
- by neutron capture technique, intracarotid injection of B, 10: 1(R)
- personnel protection, 10: 1712(J)
- with radioisotopes, factors governing isotope choice, 10: 2603(J)
- of skin lesions, procedures, 10: 47(J)
- telecobalt installations for, personnel protection, 10: 1711(J)
- teletherapy devices employing radioisotopes, design, 10: 3256
- of thyroid carcinoma, labeled endogenous thyroxine following, 10: 1715(J)
- of thyroid carcinoma with I<sup>131</sup>, 10: 2601(J)
- of thyrotoxicosis with I<sup>131</sup>, 10: 1714(J)

## Radium

- determination in ground waters and soils in the U.S., 10: 2248(R)
- determination in pitchblende ores, 10: 3448, 3450
- diffusion between solution and crystals of  $K_2SO_4$ - $RaSO_4$ - $H_2O$ , 10: 599(J)
- exposure to, pathological effects, 10: 2597(J)
- gamma field, comparison to Co<sup>60</sup>  $\gamma$  field, 10: 1507(R)
- metabolism in mice and rats, effects of time and dose, 10: 3408(R)
- radiation dosage determinations, 10: 3327(R)
- radiometric determination of, in samples of blood, urine, or feces, 10: 606
- separation of, by fractional precipitation and by ion exchange, from radium cake leach solutions, 10: 668(R)

## Radium cake

- chemical analysis for U, 10: 3455
- handling and storage, 10: 3417
- processing of, for recovery of Ra and Ba, 10: 668(R)
- storage, 10: 2253

## Radium carbonates

- neutron self absorption in, surrounded by Be, 10: 3644

## Radium isotopes (RaC)

- (See Bismuth isotopes Bi<sup>214</sup>)

## Radium isotopes (RaE)

- (See Bismuth isotopes Bi<sup>210</sup>)

Radium isotopes Ra<sup>213</sup>

- alpha decay scheme, 10: 462(J)

Radium isotopes Ra<sup>223</sup>

- energy levels, 10: 3104
- thermal neutron capture cross sections, 10: 315

Radium isotopes Ra<sup>226</sup>

- body content, radiometric determination, 10: 3175
- metabolism and pathological effects in dogs, 10: 1160(R)
- spin assignments, 10: 1729(R)

Radium isotopes Ra<sup>228</sup>

- energy of first excited state of, from Th<sup>232</sup>  $\alpha$  decay, 10: 464(J)
- metabolism and pathological effects in dogs, 10: 1160(R)

## Radon

- body content, radiometric determination, 10: 3175
- detection of trace amounts, 10: 3327(R)
- pathological effects of exposure to an atmosphere containing, on mice, 10: 548
- radiometric determination in air samples, 10: 3302(J)
- toxic effects of, in mice, 10: 553(J)

Radon isotopes Rn<sup>206</sup>

- alpha decay scheme and half life, 10: 462(J)

Radon isotopes Rn<sup>207</sup>

- alpha decay scheme, 10: 462(J)

Radon isotopes Rn<sup>208</sup>

- alpha decay scheme, 10: 462(J)
- alpha emission, 10: 461(J)

Radon isotopes Rn<sup>209</sup>

- alpha decay scheme, 10: 462(J)
- alpha emission, 10: 461(J)

Radon isotopes Rn<sup>210</sup>

- alpha decay scheme, 10: 462(J)
- alpha emission, 10: 461(J)

Radon isotopes Rn<sup>211</sup>

- alpha decay scheme, 10: 462(J)
- alpha emission, 10: 461(J)

Radon isotopes Rn<sup>219</sup>

- gamma spectra, 10: 1729(R)

Radon isotopes Rn<sup>220</sup>

- half life, 10: 463(J)

## Randsburg Area (Calif.)

- geophysical exploration, 10: 1784

## Rara Avis Mine (Colo.)

- pitchblende occurrence, 10: 1363(J)

**Rare earth chlorides**

- crystal structure, 10: 1817
- magnesium reduction at 500°C, 10: 3345

**Rare earth compounds**

- chemical properties, 10: 3416
- preparation, crystal structure, and optical properties, 10: 2391
- x-ray-diffraction studies of La carbides, 10: 571(R)

**Rare earth fluorides**

- pyrohydrolysis of, at 1000°C, 10: 62

**Rare earth hydroxides**

- crystal structure, 10: 1817

**Rare earth nitrates**

- magnetic and spectroscopic properties, variation with crystalline electric field parameters, 10: 1493(J)

**Rare earths**

- Coulomb excitation of nuclei with  $\alpha$  particles, 10: 479(J)
- crystal properties of La and Pr, 10: 571(R)
- detection and analysis of Eu, La, Dy, and Sm in mixtures of, by neutron-activation techniques, 10: 81(R)
- determination, 10: 3433
- determination in urine, by ion exchange, 10: 3440
- gravimetric determination in uranium compounds, 10: 2978
- ion exchange on Dowex-1 with  $\text{NH}_4\text{SCN}$ , 10: 3116
- metabolism, 10: 3165(R)
- metabolism and excretion rates of, in rats, 10: 1694
- in monazite, distribution of, 10: 811(J)
- neutron scattering, 10: 3655
- nuclear magnetic moments of lanthanons from hfs in paramagnetic resonance spectra, 10: 481(J)
- proton excitation of nuclei, 10: 1611(J)
- separation, 10: 3026(R)
- separation by EDTA elution method, 10: 570(R)
- separation by ion exchange, 10: 1755
- separation from actinides by ion exchange, 10: 3116
- separation from irradiated U by adsorption on silica gels, 10: 1654(P)
- separation from stainless steel by fluoride precipitation, 10: 1242(R)
- separation from U-base materials and spectrographic determination, 10: 604
- solubility of hydroxides in, 10: 658(J)
- solvent extraction, actinide and lanthanide separation by, 10: 2256(R)
- spectrographic analysis, 10: 3026(R)
- spectrographic determination in commercial Zr, 10: 62
- thermal decomposition of neocupferron chelates, 10: 2656(J)
- tissue distribution in rats, tracer study, 10: 1696(R)

**Rare gases**

- determination in air and purification, 10: 3293
- neutron scattering cross sections, 10: 3656
- scattering of slow protons in, approximation for high order phase shifts in, 10: 427(J)

**Rate meters**

- for beta-gamma survey, design and performance, 10: 249
- design, for the range 0.5 to 5000 mr/hr, 10: 953
- design of, for measuring  $\gamma$  dosage in the presence of thermal neutrons, 10: 948

**Rats**

- lethal radiation dosage determinations on, effect of age, 10: 20

**Rats (cont'd)**

- radiation effects, modification through shielding, 10: 1697
- radiation-induced mammary tumors, 10: 3143(R)
- radiosensitivity, 10: 1985(J)
- respiration patterns, 10: 1729(R)
- urinary excretion patterns of, effects of total-body x irradiation on, 10: 28(J)
- x-radiation effects and protective action of chemical agents, 10: 1167
- x ray induced splenic lesions in, 10: 1178(J)

**Reaction mechanisms**

(See also Organic syntheses; Photochemistry; Photosynthesis; Solid state reactions.)

- analysis of chemical reactions associated with isomeric transitions, 10: 3654(R)
- initiation by gamma and other ionizing radiations, 10: 3179
- isotope effect in organic syntheses, 10: 1310(J)
- kinetics of processes distributed over a range of activation energies, 10: 2962(J)
- kinetics of solid-state reactions, 10: 1335
- radiation effects, 10: 2977
- theory of rate processes, 10: 563

**Reactions**

(See Chain reactions.)

**Reactivity Measurement Facility**

- calculations of hole size for maximum reactivity, 10: 3040
- control elements, description and function, 10: 3041
- criticality calculations, 10: 2449(R)
- instrumentation, 10: 2142(R)
- loading, operation, and safety hazards, 10: 1046
- methods for making measurements in, theoretical aspects, 10: 2894
- startup procedure, 10: 3041

**Reactor atmospheres**

- radioactivity of gas in water boiler neutron source, 10: 2544(R)

**Reactor components**

- fuel leak in North Carolina Research Reactor, 10: 1557
- powder metallurgy of, techniques and advantages, 10: 1409(J)

**Reactor control rods**

(See also Reactor control systems; Servomechanisms.)

- actuator for decelerating, design, 10: 2536
- boron carbides used in, effects of neutron irradiation, 10: 1599
- boron stainless steel for, properties of, 10: 3716
- burn up of  $\text{U}^{238}$  in, calculation, 10: 2887
- calibration for ORNL Graphite Reactor, 10: 2514
- design for LITR, 10: 2526
- design of MTR Mockup, 10: 3688
- hydraulic drive mechanisms, 10: 1061(J)
- neutron diffusion in, treatment with two-space dimension multigroup difference equation framework, 10: 1002
- stability and magnetic phenomena in boron stainless steel, 10: 1552
- theory for cylindrical reactors, 10: 1544
- two-phase servomotors for driving, 10: 1567(J)

**Reactor control systems**

(See also Reactor control rods; Servomechanisms.)

- calculations associated with cylindrical, 10: 1544
- design and operation, 10: 3041



## Reactor control systems (cont'd)

- hydraulic, design of, 10: 1061(J)
- instrumentation, symposium on, 10: 2467

## Reactor coolants

- activities induced in cooling water, measurement of, 10: 385(J)
- corrosive effects of pile water on stainless steel, 10: 2432
- Dowtherm 'A', evaluation of, 10: 2897
- monitoring of fission products in coolant streams, 10: 3147
- radioactivity induced in, 10: 3708
- radioactivity induced in MTR water, 10: 2509(R)
- shielding for bremsstrahlung produced in containers for  $\text{Li}^+$ , 10: 3404
- velocity, as function of pressure drop across fuel elements, 10: 2529

## Reactor cooling systems

- analysis of, for power production reactors, 10: 1551
- radiation hazards from leaks, 10: 120(R)
- tests on effect of high velocity water flowing normal to long thin rods, 10: 2517
- water-spray, for air-cooled reactors, 10: 3386

## Reactor engineering

- computer codes for problems in, bibliography, 10: 1868
- design of low-cost modified MTR Mockup for research, 10: 2545
- liquid metals, interfacial tension and spreading studies, 10: 1063(J)

## Reactor experimental facilities

(See also Reactor thermal columns.)

- beam hole criticality effects in BSF, 10: 320(R)

## Reactor fuel alloys (liquid)

- properties and corrosive effects, 10: 2440(R)

## Reactor fuel elements

(See also specific types of reactor fuel elements, e.g. Reactor fuel plates; Reactor fuel rods.)

- assaying, non-destructive method for, 10: 2165
- buckling in reactor lattices and correlation with theory, 10: 1554
- burnup in MTR, determination by  $\gamma$  scanning, 10: 2890
- composition and growth of fission products during reactor operation, 10: 1930(J)
- coolant velocity as function of pressure drop across, 10: 2529
- determination of thermal stresses in, 10: 884
- fission product escape from, He leak detection system for, 10: 2513
- gamma emission and radioinduced heating of spent, 10: 3157
- heat conduction and temperature distributions during reactor power excursions, 10: 2512(R)
- heat transfer analysis of internally-externally cooled, 10: 1553
- inspection and handling of irradiated, underwater facility for, 10: 2744(J)
- laminated, thermal conductivity in, 10: 2402
- loading into reactors, apparatus for, 10: 3073(P)
- nondestructive assaying of MTR, 10: 378
- powder metallurgy of, techniques and advantages, 10: 1409(J)
- reprocessing methods for power reactors, 10: 1923
- testing of ceramic, for thermal rupture, 10: 3385
- thermal conductivities of materials for, 10: 3616
- thermal expansion and stresses in spherical, 10: 1559
- thermal neutron density in Zeep, 10: 3314(R)
- thermoelectric power developed by thermal gradient in, 10: 2494(R)
- ultrasonic inspection, 10: 2084
- wastes from, disposal of, 10: 1330(J)

## Reactor fuel plates

- clad, dimensional stability, effect of thermal cycling on, 10: 2965
- gamma intensity from MTR, as sources in  $\gamma$  irradiation facility, 10: 2750
- reactivity measurement in RMF, theory and methods, 10: 2894
- temperature distribution in, with exponentially rising power, derivation of equations, 10: 1925

## Reactor fuel rods

- burn up of  $\text{U}^{235}$  in, calculation, 10: 2887
- heat production after shutdown, 10: 2511
- neutron diffusion in, considering effects of air channels, 10: 1064(J)
- neutron flux distribution and utilization of Al-clad 1.027%-enriched U rods in  $\text{H}_2\text{O}$ , 10: 3228
- Pu isotopic composition of NRX, 10: 1411(R)
- storage and handling safety of SRE, 10: 3254
- thermal buckling in tubular coolant duct, 10: 1062(J)
- thermal stresses in, 10: 1561
- vibration due to high velocity water flowing normal to, 10: 2517
- warping, 10: 3636

## Reactor fuels

- circulation systems for homogeneous, use of thermal syphon for, 10: 2522
- economic considerations of suggested, for power reactors, 10: 1551
- handling equipment and hot-cell design, 10: 3244
- hot-cell design for handling, 10: 3110
- processing by electrowinning, 10: 2683
- separation and purification of, from U ore concentrates, 10: 734(J)

## Reactor fuels (liquid)

(See Reactor slurries; Reactor solutions.)

## Reactor hazards

(See Reactor safety.)

## Reactor materials

- corrosion, 10: 3593
- corrosion and chemical oxidation as a means of plugging holes in Al, 10: 3608
- filler block graphite, radiation effects, 10: 2315
- gamma activity induced in, by reactor radiation, 10: 3678
- gamma activity induced in, method of calculating, 10: 2921(J)
- graphite, ionization and energy transfer by charged particles in, 10: 2316
- graphite, radiation effects, 10: 2497(R)
- graphite, resistivity changes from charged particle bombardment, 10: 2318
- graphite resistivity changes due to deuteron and  $\alpha$  bombardment, 10: 2317
- radiation effects of x rays on plastic dielectrics, 10: 3739
- suitability of Zr for, and properties of, 10: 3602
- thermodynamic properties of U, Th, Nb, Fe, and C, 10: 3673

## Reactor matrices

(See also Critical assemblies.)

- anisotropy, buckling, neutron age, and neutron flux distribution in  $\text{U}-\text{D}_2\text{O}$ , 10: 3314(R)
- buckling, reactivity coefficient of, 10: 3391
- buckling and criticality measurements, correlation with theory, 10: 1554
- buckling and criticality measurements of light water, 10: 3038
- buckling of light-water moderated lattices of 0.387 in.-diam. 1.027%-enriched U rods, 10: 3398
- buckling of natural  $\text{U}-\text{H}_2\text{O}$ , 10: 3392

## Reactor matrices (cont'd)

- critical mass of a spherical reactor, 10: 2537
- criticality and neutron flux measurements in light-water, 10: 3229
- criticality of NAA, effect of  $U^{235}$  resonance absorption on, 10: 3315(R)
- graphite-U, exponential measurements, 10: 1922
- heat generation in MTR, 10: 2546
- neutron cross sections for H-moderated assemblies, 10: 3220
- neutron diffusion, 10: 2491
- neutron diffusion anisotropy in lattices of U rods, 10: 3379(R)
- neutron diffusion in  $H_2O$ -U, 10: 2516
- neutron distribution studies in, effect of foil holder perturbation, 10: 3154
- neutron flux distribution, 10: 3658, 3659(R)
- neutron flux distribution, calculated by relaxation mesh method, 10: 2562
- neutron flux distribution and parameters of  $U^{235}$  -  $H_2O$ , 10: 2284
- neutron flux distribution and utilization of Al-clad 1.027%-enriched U rods in  $H_2O$ , 10: 3228
- neutron flux distributions and buckling in  $D_2O$ , 10: 3379(R)
- neutron losses in, and angular distribution of neutrons from a plane surface, 10: 3643
- neutron slowing down by  $U^{235}$  -  $H_2O$ , Monte Carlo calculations, 10: 2858
- neutron temperature in  $H_2O$ -moderated lattices, 10: 3145
- parameter measurements on slightly enriched U- $H_2O$ , 10: 3403
- thermal utilization and lattice diffusion lengths in graphite-U, 10: 1546
- times behavior of subcritical assemblies, 10: 382

## Reactor mockups

(See Critical assemblies.)

## Reactor moderators

(See also Beryllium moderated reactors; Graphite moderated reactors; Heavy water reactors; Hydrogen moderated reactors; Reactor materials; Water moderated reactors.)

- neutron flux distribution, calculated by relaxation mesh method, 10: 2562
- neutron flux distribution, effect of temperature, 10: 1498
- radioactivity induced in MTR water, 10: 2509(R)

## Reactor oscillators

- circuit for CP-3, 10: 3657
- design and operation, 10: 3651(R)
- frequency of, effect on amplitude, 10: 3315(R)
- theory of oscillating absorber in a nuclear reactor, 10: 3712

## Reactor reflectors

- flux distribution, effects of a fuel plate on, 10: 1924

## Reactor safety

(See also Criticality studies; Reactor control rods; Reactor control systems.)

- accident to NRX reactor, 10: 375
- experimental program on, AEC, 10: 3235
- KEWB facilities, description and theoretical studies, 10: 3316
- mathematical analysis of differential equations arising in study of, 10: 1560
- neutron fuses, feasibility, 10: 3656
- power excursions, analysis of fuel rod thermal expansion during, 10: 1561
- of pressurized water boiling reactor systems, hazard from fission-product heat in accidents, 10: 2167
- rod actuator, 10: 2536
- symposium on reactor instrumentation, 10: 2467

## Reactor shield voids

- effects on gamma penetration, 10: 3743

## Reactor shield voids (cont'd)

- gamma leakage through spherical and cylindrical, 10: 3406
- gamma transmission through air slots in  $H_2O$ , 10: 3394
- neutron and  $\gamma$  transmission in air slots, 10: 3393
- neutron distributions around air slots in  $H_2O$ , 10: 3397
- neutron streaming through, in MTR, 10: 2559
- neutron transmission through air slots, effect of multiple offsets on, 10: 3396
- neutron transmission through air slots in water, effect of an offset on, 10: 3319
- neutron transmission through air slots in  $H_2O$ , effect of vertical position of single offset on, 10: 3395
- neutrons emerging from, angular distribution, 10: 3376

## Reactor shielding

(See also Shielding.)

- design and calculations, for boiling reactors, 10: 2534
- design manuals for, 10: 3318
- design of APPR, 10: 1563
- design of concrete-paraffin barriers, 10: 1675(P)
- design of MTR Mockup, 10: 2525
- gamma attenuation in ORNL Research Reactor materials, 10: 2561
- materials for, neutron and  $\gamma$  attenuation in Fe,  $B_4C$ , and borated  $H_2O$  systems, 10: 3742
- neutron and  $\gamma$  attenuation in  $B_4C$  and borated  $H_2O$ , 10: 3676
- neutron flux distribution in concrete for HRE, 10: 3699
- neutron reflection in, 10: 2544(R)
- properties of concretes containing metal aggregates, 10: 3075(P)
- temperatures in bottom thermal, of MTR, calculation, 10: 2558
- theory, 10: 3658
- theory and calculations, 10: 2187
- thermal neutron, design and construction, 10: 3083(P)
- thermal stresses in concrete, 10: 2527

## Reactor simulators

- package power reactors analyzed by, 10: 3383

## Reactor slurries

(See also Fluid fuel reactors; Homogeneous Reactors; Reactor fuel alloys (liquid); Reactor solutions.)

- circulation systems for, use of thermal syphon for, 10: 2522

## Reactor solutions

- circulation systems, feasibility of thermal syphon for, 10: 3685

## Reactor thermal columns

(See also Reactor experimental facilities.)

- neutron flux distribution, for heterogeneous reactors, 10: 2523

## Reactor tubes

- pressure effects, 10: 2442

## Reactors

(See also specific types of reactors, e.g. Beryllium moderated reactors; Fluid fuel reactors.)

- analysis by group and perturbation theory, and reactivity, 10: 2108
- buckling, procedure for estimating critical Laplacian, 10: 1060
- calculations for operation, 10: 3649(R)
- calculations for partly spherical, 10: 3710
- calculations for three-region, two-group, two-dimensional, Oracle coding, 10: 3317
- chemical reactions in, theoretical, 10: 3673
- computer codes for problems, bibliography, 10: 1868
- control, theory, 10: 3722

## Reactors (cont'd)

control and neutron flux distribution calculations for cylindrical, 10: 1544

control rods, boron steel, 10: 1552

coolant monitoring for fission products, 10: 3147

critical conditions for multiplying-slab, with non-multiplying reflector, 10: 3727

criticality conditions for black eccentric control rod, one-group calculations, 10: 1926

cylindrical bare, solutions to problems on critical radius and reactivity, 10: 1057

design, metallurgical problems in, 10: 1931(J)

design and cost estimates of Swedish, 10: 1059

design of pressure vessels, 10: 1927

diffusion equation, rates of convergence in numerical solution, 10: 1028

electricity production by  $\beta$  particle utilization, 10: 3087(P)

electromagnetic rod-position indicator for, design, 10: 3091(P)

exponential experiment, and derivation of multiplication equation, 10: 2563

exponential measurements, 10: 3658

feasibility, 10: 1066(J)

fission-product poisoning, distribution functions for calculating, 10: 3726

fuel-element-loading device, 10: 3073(P)

fuel processing at ICPP, 10: 2170(J)

fuel rod burn-up calculations, 10: 2887

fuel rod warping, 10: 3636

gamma activity induced in commercial materials by radiation from, 10: 3678

group theory and neutron flux distribution, numerical integration of equations, 10: 2543

group theory and reactivity, 10: 3659(R)

heat transfer, 10: 3680

heat transfer, theory, 10: 1337

heat transfer analysis of, with internally-externally cooled fuel elements, 10: 1553

heat transfer and cooling in, 10: 1336

heat transfer mechanisms for removal of energy from, 10: 2541

heat transfer studies, 10: 1507(R)

instrumentation, symposium on, 10: 2467

liquid metals in, interfacial tension and spreading studies, 10: 1063(J)

neutron diffusion theory of thermal fine structure in, effect of air channels on, 10: 1064(J)

neutron distribution in homogeneous and heterogeneous, 10: 2898(J)

neutron flight theory of bare critical, 10: 376

neutron flux depression in neighborhood of a foil, 10: 3656

neutron flux distribution, boundary condition between two multiplying media, 10: 3711

neutron flux distribution, effect of moderator temperature, 10: 1498

neutron flux distribution, fluctuation caused by oscillating point absorber, 10: 3712

neutron flux distribution, mathematical analysis of, 10: 3237

neutron flux distribution for time dependent reactivity in, solutions of equations for, 10: 3236

neutron flux measurements, in foil method, 10: 3234

neutron flux measurements in, instruments for, 10: 1683(P)

neutron leakage and slowing down, 10: 3721

neutron leakage estimation, 10: 1558

## Reactors (cont'd)

neutron source for production of radioisotopes, 10: 3709

perturbation theory applied to Boltzmann formulation of equation, 10: 3719

poisoning by fission products, 10: 1058

poisoning by Xe, critical mass needed to over-ride, 10: 3728

poisoning of Chalk River, by  $U^{235}$  fission products, 10: 2885

for power, design, 10: 2168

problems, solution by numerical methods, 10: 3655

reactivity changes, two group equations for calculating, 10: 3148

reactivity changes due to changes in composition, perturbation methods for calculating, 10: 373

reactivity during power excursion, 10: 2512(R)

safety, reactivity control by thermal expansion of fuel rods, 10: 1561

safety record of AEC, from 1944 through 1954, 10: 383(J)

temperature and power variation with reactivity and cooling, 10: 387(J)

theory, lectures on elementary, 10: 3311

theory and neutron flux distributions, 10: 1001

theory of neutron flux distribution, neutron leakage, breeding, and criticality, 10: 3720

two group calculations, accuracy of, 10: 1056

two-group diffusion theory of bare, variational principle for, 10: 1055

uranium and Th powder preparation for, 10: 1827(J)

water cooled, feasibility at high coolant temperatures and pressures, 10: 1034

water cooling, effect of high velocity flow normal to long thin rods, 10: 2517

water cooling, heat transfer rates for cross flow of water through a tube bank at high Reynolds number, 10: 2053

water cooling, radioactivity induced in, 10: 3708

water cooling, temperature distribution in Al sheath for fuel rods, 10: 3713

windows for viewing of reactor face of Hanford, 10: 386(J)

## Reagents

(See Chemicals and reagents.)

## Recorders

(See Data recording systems.)

## Recapture Member (N. Mex.)

exploration and geology, 10: 2063

## Red Canyon Area (S. Dak.)

exploration, geology, and U occurrence, 10: 1789(J)

## Red Canyon Quadrangle (Colo.)

exploration, geology, mineralogy, 10: 159(J)

## Redox Process

analysis of process solutions for Ru, 10: 3174

freezing point data for uranyl nitrate-water systems, 10: 2381, 2382

## Reduction

by irradiation, of aqueous solutions, 10: 1278(J)

## Refractories and crucibles

(See Beryllium oxides; Ceramic materials; Graphite crucibles.)

## Refractory materials

(See also Ceramic materials.)

electrical and physical properties of SiC-clay bodies, 10: 2424(R), 2425(R)

electrical resistance of calcite and kaolin-base bodies, 10: 2423(R)

electrical resistance of calcite and kaolin bodies, effect of SiC and FeSi additions on, 10: 2422(R)



## Refractory materials (cont'd)

- fabrication and electrical properties of SiC-kaolin bodies containing BaO or BaCO<sub>3</sub>, 10: 2427(R)
- fabrication and properties of BeO grain bodies, 10: 2414(R)
- fabrication and properties of fractional BeO grains, 10: 2411(R), 2412(R)
- fabrication and purification of BeO grain bodies, 10: 2415(R)
- fabrication of semi-conductors containing TiO<sub>2</sub> or SiC, 10: 2421(R)
- firing expansion of BeO bodies, effect of process variables on, 10: 2419(R)
- high-temperature properties and applications, 10: 1345(J)
- physical properties of BeO bodies, effect of firing at elevated temperatures on, 10: 2410(R)
- physical properties of fired BeO bodies, effect of process variables on, 10: 2417(R)
- preparation, grain size, and density of BeO powders, 10: 2408(R)
- preparation of metal bonded to Zr diboride, 10: 2700
- properties, effect of firing temperatures and beryllia and beryl powder on, 10: 2413(R)
- properties and industrial applications, 10: 1346(J)
- properties of pressed BeO cylinders, 10: 2416(R)
- separation from U-base materials and spectrographic determination, 10: 604
- specific gravity, porosity, and spalling of BeO bodies, effect of process variables on, 10: 2409(R)
- thermal, electrical, and physical properties of SiC-clay bodies, 10: 2426(R)
- thermal rupture and volume expansion of fired BeO bodies, 10: 2420(R)
- thermal rupture in BeO bodies, effect of particle size on, 10: 2418(R)

## Registers

(See Counting devices.)

## Regulators

(See Current regulators.)

## Remote-control equipment

(See also Laboratory equipment; Servomechanisms.)

- for chemical laboratory, list, 10: 2323
- for density measurements on radioactive materials, 10: 2048
- design, 10: 2024
- design for continuous liquid extractor, 10: 1817
- design of a magnetic induction flow meter for liquids, 10: 2322
- design of hot-lab manual manipulator, 10: 644
- extensometer, design, 10: 1860(J)
- ground handling, description and maintenance data for ASTR, 10: 2895
- maintenance crane for radiochemical processing plant, design, 10: 2462
- for transferring fluids, design, 10: 1655(P)

## Remote-viewing equipment

- for Hanford reactors, windows for, 10: 386(J)
- periscope for maintenance crane at Hanford Works, 10: 3621
- periscope system for handling of radioactive material, 10: 647(J)
- for radiochemical processing plants, design, 10: 2462

## Rensselaer Polytechnic Inst., Troy, N. Y. Powder Metallurgy Lab.

- progress reports on powder metallurgy of Be, 10: 3614

## Research reactors

(See also specific research reactors, e.g. Argonne Research Reactor; ORNL Research Reactor.)

- cost estimates, 10: 1332
- design, for medical and biological studies, 10: 1566(J)
- design of low-cost modified MTR Mockup, 10: 2545
- design of modified water-boiler-type, 10: 1067(J)

## Resins

(See also Ion exchange materials; Plastics.)

- adsorption of U and Cl<sup>-</sup> and SO<sub>4</sub><sup>2-</sup> ions on, 10: 2987
- adsorptive properties of, for U, 10: 2660
- cyclic testing for U recovery, 10: 2665
- efficiency for use in U recovery, 10: 2037
- efficiency in U recovery, 10: 3114
- epoxy, casting of transformers, bushings and potheads, 10: 787
- loading, elution, and poisoning characteristics of IRA-400 and XE-75, 10: 3117
- performance in Western Reefs pilot plant, 10: 2677
- recovery of U with ion exchange, 10: 3342
- sorption of U on, effects of interfering ions on, 10: 3343
- sorptive properties for U, testing equipment for, 10: 3347
- stability of anion-exchange, in perchlorate media, 10: 2625(R)
- toxic effects of exposure to, 10: 549(J)

## Resistance furnaces

- design and operation, for high vacuum-high temperature applications, 10: 1833(J)

## Resistance thermometers

- cryoscopic measurements with, 10: 3022

## Resonance cross sections

(See Neutron resonance cross sections.)

## Resonance neutrons

- density, ratio to thermal neutron density, 10: 1495

## Resonators

(See Cavity resonators.)

## Respiration

- effects of radiation on, in slices of spleen and thymus glands of rats, 10: 37(J)
- in fungi, effects of radiation, 10: 1991(J)

## Reticulo-endothelial system

- effects of  $\alpha$  particles from Po on function, tracer study, 10: 1983

## Rhenium

- recycle recovery from calutrons, 10: 2335
- vapor pressures at elevated temperature, 10: 69(J)

## Rhenium complexes

- with dimethylglyoxime, study of, 10: 1732(J)

## Rhenium isotopes

- gamma yields from Coulomb excitation, 10: 3144(R)

Rhenium isotopes Re<sup>183</sup>

- decay schemes, 10: 1729(R)

Rhenium isotopes Re<sup>184</sup>

- energy levels, 10: 1729(R)

Rhenium isotopes Re<sup>186</sup>

- neutron total cross sections at 1 to 13 ev, and neutron resonances, 10: 2151(J)

Rhenium isotopes Re<sup>186</sup>

- beta- $\alpha$  directional correlations, 10: 3387(R)
- beta-gamma correlation in decay, 10: 3323
- beta spectrum and half life of, 10: 1103(J)

- beta transitions in, coincidence techniques for measuring first forbidden non-unique, 10: 3380

- decay, gamma ray energy and intensity measurements, 10: 2927(J)

Rhenium isotopes Re<sup>187</sup>

- neutron total cross sections at 1 to 13 ev, and neutron resonances, 10: 2151(J)

**Rhenium oxides**

lattice energy, calculation, 10: 2768(J)

**Rhodium**

chromatographic separation and colorimetric determination, 10: 622(J)

**Rhodium isotopes Rh<sup>103</sup>**

nuclear isomerism, decay scheme, and coefficients of internal conversion electrons, 10: 472(J)

**Rhodium isotopes Rh<sup>104</sup>**

decay, use in neutron detection systems, 10: 2834(J)

**Rhodium isotopes Rh<sup>106</sup>**

decay properties, and energy levels of Pd<sup>106</sup>, 10: 2202(J)

nuclear properties of isomeric, 10: 1018(J)

**Rhodium isotopes Rh<sup>107</sup>**

decay, 10: 934(J)

**Ribonucleic acid, desoxy-**

biosynthesis of, in *Vicia*, effects of x irradiation on, 10: 32(J)

of pneumococci, effects of  $\gamma$  radiation on, 10: 30(J)

**Ribonucleic acid, desoxy-, sodium salts**

gamma radiation effects on solutions of, 10: 1276(J)

**Ribonucleotides, desoxy-**

properties of, effects of *in vitro* irradiation on, 10: 518

**RMF**

(See Reactivity Measurement Facility.)

**Rochester, N. Y. Univ. Atomic Energy Project.**

buildings and facilities for radioactive inhalation studies, 10: 1776

report and publication list covering 1943 through June 1955, 10: 3092

**Rock Corral Area (Calif.)**

geophysical exploration, geology, mineralogy, and occurrence of radioactive minerals, 10: 161(J)

**Rocket motor nozzles**

flame resistance studies on SIC-graphite, 10: 791

**Rocks**

(See also Carbonaceous rocks; Phosphate rocks.)

analysis of Th and U concentration ratios in Indian, 10: 1744(J)

quantitative mineralogical analysis of, 10: 2711(J)

**Rosamond**

heat transfer from parallel, with axial flow of water, 10: 2052

thermal buckling in tubular coolant duct, 10: 1062(J)

**Rohm and Haas Co., Philadelphia.**

progress reports on the recovery of U by ion exchange, 10: 2991(R)

**Rohm and Haas Co. Research Labs., Philadelphia.**

progress reports, 10: 722(R)

progress reports on electrolytic membrane cell work, 10: 2992(R)

progress reports on recovery and purification of U by ion exchange, 10: 107(R)

progress reports on U recovery with ion-exchange resins, 10: 723(R), 724(R)

**Roosevelt Quadrangle (Ariz.)**

map of, radiometric observations of Tonto Creek to Globe-Young road in, 10: 1353

**Rosette**

radiosensitivity of bean, effects of atmospheric H on, 10: 539(J)

**Rosamond Prospect (Calif.)**

geophysical exploration, 10: 1784

**Rosette Prospect (Nev.)**

exploration, 10: 1358

**Rotary pumps**

performance, design of motors and magnetic couplings, 10: 3588

**Rubidium**

determination in K-Na alloys, KOH, and KCl by radioactivation and ion exchange chromatography, 10: 1232

**Rubidium-bismuth alloys**

superconductivity, 10: 197(J)

**Rubidium borohydrides**

proton magnetic resonance, 10: 2222(J)

**Rubidium isotopes**

purification, 10: 3026(R)

**Rubidium isotopes Rb<sup>83</sup>**

decay scheme, 10: 450(J)

**Rubidium isotopes Rb<sup>84</sup>**

decay of, K-capture-positron ratios for first forbidden transitions and relative probabilities of L- and K-electron capture, 10: 349(J)

**Rubidium isotopes Rb<sup>88</sup>**

formation by  $\beta$  decay of Kr<sup>88</sup>, 10: 3656

**Rutgers Univ., New Brunswick, N. J.**

progress reports on boron polymers, 10: 1219(R)

**Ruth Group (Ariz.)**

geology, 10: 796

**Ruthenium**

absorption spectra of Ru<sup>3+</sup> in HClO<sub>4</sub>, 10: 3104

denitration, volatilization during, 10: 2375

electrochemical determination in Redox solutions, 10: 3174

hyperfine structure in spectrum, 10: 2876(J)

neutron cross sections at 120 ev and 345 ev, 10: 3656

solvent extraction, behavior during, 10: 3490

spectrophotometric determination, 10: 570(R)

tissue distribution and maximum permissible concentration in rats, 10: 3409(R)

**Ruthenium isotopes**

gamma yields from Coulomb excitation, 10: 3144(R)

isotopic ratio and activity determination for Ru<sup>100</sup>-Ru<sup>106</sup> material, method for, 10: 3209

**Ruthenium isotopes Ru<sup>87</sup>**

decay scheme, 10: 457(J)

disintegration, and formation of Tc<sup>87</sup> from, 10: 3740

**Ruthenium isotopes Ru<sup>100</sup>**

plant metabolism, 10: 2970

**Ruthenium isotopes Ru<sup>106</sup>**

cutaneous effects of continued exposure in swine and rabbits, 10: 3409(R)

radioautographic determination in lung tissue, 10: 1203

**Ruthenium isotopes Ru<sup>108</sup>**

decay, 10: 934(J)

**Ruthenium nitrates**

complexes in HNO<sub>3</sub>, 10: 2011(J)

preparation, properties, and molecular structure, 10: 2010(J)

**Ruthenium nitrosyls**

properties and molecular structure, 10: 2011(J)

**Ruthenium-uranium alloys**

phase studies, 10: 3603

**Ryan Aeronautical Co., Lindbergh Field, San Diego, Calif.**

progress reports on Ti formability and welding characteristics, 10: 1366(R)

## S

- S particles  
(See also K Particles.)  
lectures on, by B. Rossi, 10: 324(J)
- S-Process  
(See Dual Temperature Process.)
- Sabugalites  
occurrence in the Brule and Chadron Formations in Dawes Co. Nebr., 10: 3192
- St. Johns Area (Ariz.)  
exploration of Chinle Formation in, 10: 796
- Safety Rods  
(See Reactor control rods.)
- Salamanders  
embryos, effects of radiation, anoxia, cold, and hydrocyanic acid, 10: 2591(J)
- Salivary glands  
radioinduced changes, in dogs, 10: 1164
- Salt Wash Member  
of Morrison Formation, uranium mineralization and ore deposits, 10: 800  
petrology, prospecting, bulk density of samples from, 10: 149(R)
- Saltex Process  
(See Purex Process.)
- Salts  
(See also specific classes of salts by name of metal. See also Fused salts.)  
chemical properties of metal-salt redox pairs, 10: 2518(R)
- Samarium  
gamma capture in, internal conversion, 10: 3657  
heat of combustion, 10: 2657(J)  
radioactivity, 10: 1099
- Samarium hydrides  
crystal structure, 10: 2034(J)
- Samarium isotopes  
atomic spectroscopy, isotopic shift in, 10: 2470  
electromagnetic separation, 10: 3028(R)  
electron spectra from internal conversion, 10: 3657  
energy levels, 10: 1903(R)  
proton excitation, 10: 1611(J)
- Samarium isotopes  $\text{Sm}^{147}$   
half life and alpha emission, 10: 1099
- Samarium isotopes  $\text{Sm}^{153}$   
decay schemes, 10: 3650(R)  
 $\gamma$  transitions, 10: 1411(R)
- Samarium oxides  
heats of formation, 10: 2657(J)
- Sampling  
of aerosols for Pu dust, design of annular impactor, 10: 2828(J)
- San Luis Valley Area (Colo.)  
exploration, 10: 1352
- San Rafael Group (Colo.)  
geology, 10: 155(J), 156(J), 157(J), 158(J), 159(J)
- Sandstone deposits  
formation, role of  $\text{CO}_2$  in, 10: 821(J)
- Sangre de Cristo Province (Colo.)  
exploration, 10: 1352
- SAPL assemblies  
(See KAPL Intermediate Power Breeder Critical Experiments.)
- Sapphires  
infrared transmission at various temperatures, 10: 1342(R)
- Saskatchewan  
uranium deposits in Goldfields Area in, 10: 808(J)
- Scalers  
Higinbotham, operation, 10: 2464
- Scandium  
determination in biological liquids and in organs, 10: 3171(J)
- Scandium isotopes  $\text{Sc}^{43}$   
formation, half life, and positron end point, 10: 239(J)
- Scandium isotopes  $\text{Sc}^{44}$   
decay schemes, and connection with  $\beta$ -decay theory, 10: 2200(J)
- Scandium isotopes  $\text{Sc}^{45}$   
proton reaction (p,n) thresholds and neutron yield, 10: 397(J)
- Scandium isotopes  $\text{Sc}^{47}$   
decay, 10: 331(R)  
decay schemes, 10: 2207(J)
- Scandium isotopes  $\text{Sc}^{49}$   
decay schemes, 10: 3144(R)
- Scattering  
atomic, influence of packing on, 10: 223(J)  
of charged particles, parameter for characterization of multiple, in emulsions and cloud chambers, 10: 2914(J)  
Coulomb, in a magnetic field, magnetic analysis, 10: 2117(J)  
cross sections and relation to imaginary part of complex potential, 10: 1634(J)  
differential cross section for p-p, measurement, 10: 1009(R)  
inelastic, in positive ion beams, 10: 1444(J)  
integral equation for meson-nucleon, 10: 1009(R)  
low-energy, effects of particle size, 10: 3652(R)  
mathematical theory, as applied to electromagnetic separation of U, 10: 3750  
mean value calculations for spatial multiple, 10: 1635(J)  
momentum dependence of phase shifts, theory, 10: 494(J)  
multiple Coulomb, in thin foils, 10: 2917(J)  
multiple isotopic, theory, 10: 1136(J)  
nucleon, correlation of polarization with, 10: 1598(J)  
phase shift analysis of n,  $\alpha$  scattering, 10: 2952(J)  
phase-shift analysis of single-channel elastic, 10: 1630(J)  
quantum kinetic equation for multiple, 10: 2189(J)  
reduction of potential energy, 10: 1461(J)  
small-angle, of fast polarized neutrons, 10: 2909(J)  
state-vector normalization in theory of, 10: 1632(J)  
temperature dependence of elastic cross sections, 10: 3650(R)  
theory of polarization phenomena in nuclear, 10: 490  
theory of radiation damping in meson-nucleon, 10: 1628(J)



## Scattering cross sections

(See Meson scattering cross sections; Neutron scattering cross sections; and Proton scattering cross sections.)

## Scintillation

counting, use of shorter wavelengths in x-ray diffraction for, 10: 1873(J)

## Scintillation counters

(See Radiation detection instruments (pulse type).)

## Scintillation detectors

(See also Phosphors.)

alpha particle detection with ZnS, optimum conditions for, 10: 264(J)

analysis of radionuclide mixtures using, 10: 3637

anthracene, response to short range electrons, 10: 976(J)

anticoincidence, design and use, 10: 2495(R)

calibration, 10: 1884(J)

characteristics, 10: 3663

for charged particles in intense magnetic fields, design, 10: 1687(P)

coincidence spectrometer using, sorter for pulses from, 10: 2125(J)

design, 10: 2005(R)

design, employing two organic liquid scintillators, 10: 3327(R)

design for scattering, 10: 1837(R)

design of large-diameter, for paper chromatographic analyses, 10: 3031

design of portable, for  $\alpha$ ,  $\beta$ , and  $\gamma$  counting, 10: 3080(P)

development, for neutron scattering energy distribution measurements, 10: 3159

efficiency of anthracene, 10: 1471(J)

efficiency of Tl-activated CaI for proton detection, 10: 2844(J)

fast neutron, coincidence spectrometers utilizing, 10: 2119(J)

gamma and photoluminescence emission in NaI - Tl crystals, effects of Tl concentration on, 10: 2114(J)

liquid, properties, 10: 3144(R)

liquid, properties of secondary solutes, 10: 2827(J)

liquid organic, as threshold detectors for high-energy processes, 10: 2120(J)

localization of  $\gamma$  emitters by NaI crystals in a Pb grid, 10: 1476(J)

neutron spectrometry, 10: 1503(J)

optical mounting of, characteristics, 10: 1889(J)

organic compounds in toluene solvent, scintillation properties of, 10: 1477(J)

performance, 10: 3327(R)

performance, for high-energy  $\gamma$  dosimetry, 10: 1464

performance, in measuring  $\gamma$  emission, 10: 2814

performance for neutron detection, 10: 2818(J)

performance of, in measurement of continuous x-ray spectra, 10: 978(J)

performance of, in measuring total-body activity from the human body, 10: 946

performance of liquid, 10: 3143(R)

plant uptake of  $K^{42}$  studied by, 10: 255(J)

plastic, tetraphenyl-butadiene dissolved in polystyrene, 10: 269(J)

resolution, improvement of, 10: 2822(J)

resolution and performance, 10: 257(J)

resolution of, variation with efficiency of light collection, 10: 3144(R)

response of inorganic, organic, and plastic phosphors in, 10: 1888(J)

response to gamma radiation, 10: 3023(R)

stability, factors affecting, 10: 1161(R)

techniques for low radioisotope concentration determination, 10: 254(J)

## Scintillation detectors (cont'd)

theory of detection mechanism, 10: 1872

timing precision with, 10: 2121(J)

## Sea water

spectrophotometric analysis of, for Na, K, Ca, Mg, and Sr, 10: 1241

## Seals and glands

design of valve packings, 10: 757

## Sedimentary deposits

in Bull Canyon District, petrology, analysis of samples from, 10: 149(R)

## Sedimentary deposits (Colo.)

occurrence, 10: 1352

## Sedimentary deposits (Nev.)

occurrence in Goodsprings Mining District, 10: 1358

## Sediments

(See Silts.)

## Seed

chicory, effects of x radiation on, 10: 23(J)

radiosensitivity, effects of hydration, 10: 1192(J), 1195(J)

## Selenium

gamma rays excited by inelastic scattering of 3.7-Mev neutrons in, 10: 3034(R)

inelastic neutron scattering,  $\gamma$  rays excited by, 10: 432(J)

slow neutron transmission measurements, 10: 316(J)

## Selenium isotopes

electron spectra from internal conversion, 10: 3657

Selenium isotopes  $Se^{76}$ 

radioactivity, 10: 3658

Selenium isotopes  $Se^{78}$ 

nuclear isomerism, decay scheme, and coefficients of internal conversion electrons, 10: 472(J)

Selenium isotopes  $Se^{81}$ 

nuclear isomerism, decay scheme, and coefficients of internal conversion electrons, 10: 472(J)

## Selenium-tellurium systems

molten, temperature effect on density and electroconductivity, 10: 1405(J)

## Semiconductors

resistivity, Hall coefficient, Hall mobility measurements on  $Mg_2Ge$ , 10: 3367(R)

## Senglerites

crystallography, 10: 2066

## Separation processes

(See also specific processes, e.g. Purex Process.)

determination of fission products in Redox and Metal Recovery plant streams, 10: 3637

for fuel from power reactors, summary, 10: 1923

nitrogen oxide decontamination, 10: 3292

for separation and purification of cesium, efficiency of Amberlite IR-100 resin, 10: 106

for uranyl nitrate, by ether in a spray column, 10: 1326(J)

vacuum distillation, for separation of metal mixtures, 10: 2074

## Serums

(See also Blood serums.)

gamma radiation effects on albumin, 10: 2581(J)

## Servomechanisms

(See also Remote-control equipment.)

## Servomechanisms (cont'd)

- design, 10: 2024
- design and performance for reactor instrumentation, 10: 2467
- two-phase motors for driving reactor shim rods, 10: 1567(J)

## Sewage

(See also Waste disposal; Waste processing.)

- analysis for U, 10: 3452
- decontamination, 10: 2610
- fluorimetric analysis for U, 10: 3580
- radiometric analysis for traces of U, 10: 3123

## Seward Peninsula (Alaska)

- exploration of Ear Mountain Area in, 10: 1362(J)

## SF materials accounting

- statistical techniques, 10: 3029

## SGR

(See Sodium graphite reactors.)

## Shale deposits (Colo.)

- occurrence in Gypsum Gap Quadrangle, 10: 154(J)

## Shale deposits (Idaho)

- occurrence, 10: 151

## Shale deposits (Wyo.)

- occurrence, 10: 151

## Shales

(See also Oil shales.)

- decomposition and spectrophotometric analysis for U, 10: 2284
- recovery of U from Chattanooga, 10: 1301(R)
- uranium recovery from Chattanooga, 10: 1300(R)

## Sheep

- pathological effects of fall-out from atomic explosions compared with effects of chronic  $I^{131}$  exposure, 10: 2577
- radioiodine permissible limits, 10: 3410

## Sheeprock Mountains Area (Utah)

- geophysical exploration, U mineralization, 10: 803

## Shell Development Co., Emeryville, Calif.

- progress reports on lubrication of high speed bearings, 10: 1780(R)

## Shield ducts

(See Reactor shield voids.)

## Shield Testing Reactor

(See Bulk Shielding Facility.)

## Shielded containers

- for handling radiochemicals at curie level, 10: 95(J)

## Shielding

(See also main headings by name of radiation shielded, e.g. Gamma shielding. See also Reactor shielding.)

- design of a radiation-door assembly for the MTR, 10: 1087
- effectiveness, 10: 2024
- forming of sillimanite, for combined thermal and ionizing radiation shielding, 10: 3741
- in hot laboratories, blocks for, 10: 1686(P)
- neutron flux distribution in nonhydrogenous multilayer, 10: 1497
- nomogram for evaluation of weight change in, 10: 1615(J)

## Shielding materials

(See also specific materials.)

- concrete, construction test of, 10: 2538
- concrete-paraffin barriers for reactors, 10: 1675(P)

## Shielding materials (cont'd)

- effectiveness of sillimanite and alundum cement as combined insulation -- radiation shielding, 10: 3741
- neutron, efficiencies of docosane, boron hydrides, B, and other elements for, 10: 2492
- preparation of concretes for use as, 10: 482(J)
- radiation effects test facility for MTR, 10: 3692

## Shims

(See Accelerators.)

## Shinarump Formation (Utah)

- geology and mineralogy, 10: 160(J)
- geology of, in Dripping Springs Area, 10: 798

## Shirley Basin Area (Wyo.)

- exploration, geology, 10: 148

## Shock waves

(See also Impact shock.)

- effects of, on structures, 10: 782(J)
- luminescence of, in krypton, 10: 484
- measurements in gases, equation of state from, 10: 228
- propagation in the ozonosphere, 10: 3288
- propagation of, in solids, a literature survey, 10: 883
- structure of magnetohydrodynamic, in ionized gas, mathematical analysis, 10: 2051

## Showers

(See Electron showers; Meson showers; Photon showers.)

## Shutters

(See Cameras.)

## Sickle cells

(See Anemia; Erythrocytes.)

## Sicklemia

(See Anemia.)

## Sigma piles

- calibration for absolute neutron flux, 10: 949
- design and neutron flux distribution in the Hanford, 10: 1032
- empirical data for, 10: 3651(R)

## Silanes

- preparation of phenoxasilin and phenothiasilin derivatives, 10: 575(R)

## Silica

(See Silicon oxides; Silicon oxides (fused).)

## Silicides

- heat of formation of highly stable metal, 10: 1842(J)

## Silicon

- chemical determination in B, 10: 3421
- gamma rays excited by inelastic scattering of 3.7-Mev neutrons in, 10: 3034(R)
- inelastic neutron scattering,  $\gamma$  rays excited by, 10: 432(J)
- radioactivation analysis for P, 10: 1746(J)

spectrophotometric determination in Ca, 10: 609

spectrophotometric determination in Zr, 10: 3425

## Silicon-aluminum-chromium coatings

- for molybdenum, microstructure and oxidation, 10: 2083

## Silicon-aluminum systems

- static potential measurements, 10: 887

## Silicon-aluminum-zirconium systems

- tensile properties of low-impurity, 10: 188(R)

## Silicon carbide-boron carbide-titanium carbide systems

- density and oxidation resistance, 10: 788

**Silicon carbides**

- grain size effects on flame resistance in SiC-graphite, 10: 791
- metal and self bonding, preparation of, 10: 894
- properties and industrial applications, 10: 1346(J)
- self bonded, Cr, Fe, and Cr-Mo bonded, 10: 790

**Silicon chlorides**

- chemical determination in  $\text{BCl}_3$ , 10: 3420

**Silicon-chromium systems**

- high-temperature properties and phase studies, 10: 1392(R)

**Silicon compounds**

- with B, synthesis, 10: 1212
- copolymerization reactions with Al compounds, 10: 64(R)

**Silicon fluorides**

- absorption on alumina, 10: 3497

**Silicon-iron systems**

- corrosion by hydriodic acid, 10: 3594

**Silicon isotopes  $\text{Si}^{28}$** 

- energy level transitions in, lifetimes of, 10: 3144(R)
- energy levels in, excited by inelastic proton scattering, 10: 320(R)
- proton reactions ( $p,p'\gamma$ ), and relative yields and angular correlation of  $\gamma$  rays from, 10: 3144(R)

**Silicon isotopes  $\text{Si}^{29}$** 

- energy level in the areas of higher excitation, study of, 10: 342(J)

**Silicon isotopes  $\text{Si}^{32}$** 

- isotopic abundance, 10: 2256(R)

**Silicon nitrides**

- preparation, 10: 2250(R)

**Silicon oxide-aluminum oxide systems**

- sorptive properties for boron compounds, 10: 1724

**Silicon oxide-magnesium oxide systems**

- thermal conductivity measurement, 10: 1342(R)

**Silicon oxides**

- optical spectra of irradiated, 10: 3035(R)

**Silicon oxides (colloidal)**

- recovery from adsorption runs, 10: 568(R)

**Silicon oxides (fused)**

- infrared transmission at various temperatures, 10: 1342(R)

**Silicon-titanium systems**

- high-temperature properties and phase studies, 10: 1392(R)

**Silicon-uranium systems**

- fabrication and phase studies, 10: 3059(P)

**Silicon-zirconium systems**

- tensile properties of low-impurity, 10: 188(R)

**Silicene**

- polymerization, effect of irradiation on, 10: 1946(J)
- properties, for use in aircraft equipment cooling systems, 10: 764
- synthesis and properties, 10: 2670(R)

**Silicotungstic acid**

- (See Heteropoly acids.)

**Silts**

- density determination by radiometric techniques, 10: 3063(P)
- radioactivity of deep-sea, 10: 1802(J)
- radiometric analysis for traces of U, 10: 3123

**Silver**

- adsorption of organic compounds from aqueous solutions by, 10: 109
- alpha reactions ( $\alpha,p$ ), at 40 Mev, 10: 2175(J)
- colloidal,  $\text{Co}^{60}$   $\gamma$ -radiation effects on hydrophobic, solutions, 10: 649(J)
- diffusion coefficient for Ge in pure, 10: 996(R)
- diffusion of Au in, 10: 3199(R)
- diffusion of Zn in single crystals, 10: 2769(J)
- electrochemical exchange with Po, 10: 2257
- electron and positron transmission in, 10: 1441(J)
- grain-boundary self-diffusion in dilute Ag alloys, 10: 3286(R)
- proton scattering cross section, 10: 1009(R)
- self-diffusion, effect of Sb impurity on, 10: 2747(J)
- self-diffusion along grain boundaries of Ag-Ge alloys, effect of Ge concentration on, 10: 3134(R)

**Silver alloys**

- corrosion in 500 and 600°F water, 10: 1806
- grain-boundary self-diffusion of Ag in, 10: 3286(R)

**Silver bromides**

- self-diffusion coefficient of Ag ions in, determination by method of removing thin layers, 10: 1736(J)

**Silver chlorides**

- coprecipitation of  $\text{Tl}^+$  with, distribution coefficients, 10: 732(J)

**Silver complexes**

- with iodate ions, formation, 10: 62

**Silver-germanium alloys**

- self-diffusion of Ag along grain boundaries of, 10: 3134(R)

**Silver-gold alloys**

- annealing, grain structure, hardness, preparation, and stored energy, 10: 3012
- Hall Effect in, 10: 1385
- plastic deformation, effects of annealing, 10: 184(R)
- sintering of compacted, with other metallic powders, behavior, 10: 196(J)
- x-ray and colorimetric investigations of cold working and annealing, 10: 3012

**Silver halides**

- mass spectrographic analysis of  $\text{AgCl}$ ,  $\text{AgBr}$ , and  $\text{AgI}$ , 10: 3026(R)

**Silver iodates**

- solubility in  $\text{LiIO}_3$  and  $\text{LiIO}_3\text{-LiClO}_4$  systems, 10: 571(R)

**Silver iodides**

- absorption of, 10: 1781(R)
- adsorption of laurate ions on, 10: 3189(R)

**Silver ions**

- self-diffusion coefficient, determination of, by removing thin laminae, 10: 1736(J)

**Silver isotopes  $\text{Ag}^{104}$** 

- production by decay of  $\text{Cd}^{104}$ , and decay properties of, 10: 1908(J)

**Silver isotopes  $\text{Ag}^{106}$** 

- decay properties, and energy levels of  $\text{Pd}^{106}$ , 10: 2202(J)

**Silver isotopes  $\text{Ag}^{107}$** 

- Coulomb excitation and energy levels, 10: 2149(J)

**Silver isotopes  $\text{Ag}^{108}$** 

- Coulomb excitation and energy levels, 10: 2149(J)

**Silver isotopes  $\text{Ag}^{111}$** 

- decay properties, 10: 1903(R), 3329(R)
- formation cross section from deuteron bombardment of U, 10: 2239(J)



Silver isotopes  $\text{Ag}^{111}$  (cont'd)

formation cross sections of, from  $\text{U}^{238}$  bombarded with 19- to 190-Mev deuterons, 10: 2237

## Silver Lady Claims (Calif.)

geophysical exploration, 10: 1784

## Silver sulfides

electrochemical properties in flotation processes, 10: 1781(R)

## Silver-uranium alloys

alloying theory, 10: 3361

liquid metal extraction for Pu, 10: 2379

## Simulators

(See Computers; Reactor simulators.)

## Singer Mine (Nev.)

mineralogy, 10: 1358

## Single crystals

(See also headings by name of materials, e.g. Copper crystals.)

paramagnetic resonance absorption, anisotropy measurements of, 10: 310(J)

## SIR

(See Submarine Intermediate Reactor.)

## Sintering

interaction between metals and atmospheres during, 10: 2743(J)

mechanisms in nonvolatile metals and oxides, 10: 1829(J)

## Skein Mesa Area (Colo.)

geophysical exploration, 10: 806

## Skeleton

(See also Bones.)

deposits of  $\text{Sr}^{90}$  in, in vivo production of  $\text{U}^{90}$  from, in young dogs, 10: 558(J)

## Skin

burns in porcine, effects of superimposed exposures, 10: 3253

effects of fall-out from thermonuclear explosions on, 10: 16

effects of thermal radiation on, in swine, 10: 2243

fixation, for microscopic examination of elastic fibers and sinews, 10: 1156(J)

pathological effects of Be implants in swine, 10: 3257

radiation effects, 10: 3143(R)

radiosensitivity, effects of anoxia and temperature, 10: 1190(J)

thermal radiation effects on, in swine, 10: 1984

thermal shielding, effectiveness of various fabrics, 10: 3096

## Skin diseases

radiotherapy of, procedures, 10: 47(J)

## Skull Creek Area (Colo.)

geophysical exploration, geology, 10: 1351

## Slags

cerium, recovery of I from, 10: 1817

recovery of Th from, 10: 3484

titaniferous, preparation and chlorination from Idaho ilmenites, 10: 1735(J)

## Slim Buttes Area (S. Dak.)

exploration and geology, 10: 1790(J)

## Slow neutrons

(See Thermal neutrons.)

## Slug canning

(See also Slug cans; Slug elements; Slugs.)

operating processes for ORNL Graphite Reactor, 10: 3581

sample preparation of Hanford special irradiation requests, 10: 2539

## Slug cans

(See also Slug canning; Slugs.)

corrosion by water, effects of coagulants, 10: 2431

## Slug elements

(See also Reactor fuel elements; Slugs.)

inspection and handling of irradiated, underwater facility for, 10: 2744(J)

inspection by He leak detectors, 10: 2512(R)

rupture in autoclave, 10: 2512(R)

thermal expansion, design of electrical detection system for, 10: 1673(P)

## Slug elements (Al clad)

heat transfer in Al cladding, 10: 3713

## Slugs

analysis for  $\text{U}^{235}$ , gamma scintillation spectrometer for, 10: 3002

analysis of MTR Th, for  $\text{U}^{233}$ , 10: 1144

supersonic transmission in, 10: 3715

## Slugs (Al clad)

neutron flux distribution, effect of Al end caps on, 10: 3658

(See also materials being slurried, e.g. Uranium oxide slurries.)

## Slurries

flow, ratio of solid velocity to mixture velocity in, 10: 3102

## Slurry Reactor

(See Homogeneous Reactor Experiment.)

## Snow Flake Claim

geophysical exploration, geology, 10: 1350

## Sodium

activation determination in Li metal, 10: 2630(J)

analysis for Ba, 10: 1238

analysis for carbon, 10: 1738

analysis for  $\text{O}_2$ , 10: 2258(R)

corrosive effects on Globeiron, 10: 2054

determination of, in metallic Al, 10: 875(J)

determination of specific activity of, in bone, 10: 623(J)

ion exchange in concentrated NaCl-MCl solutions, 10: 2668(J)

neutron resonances, 10: 3655

proton resonance energies, 10: 1531(J)

solid-liquid transition, x-ray-diffraction studies, 10: 1896

spectrographic determination in barium nitrate, 10: 1234

spectrophotometric determination of, in sea water, 10: 1241

spectrophotometric determination of small amounts of, in water, 10: 84

surface tension in diluted-to-capacity amalgam of, 10: 602(J)

## Sodium (liquid)

corrosive effects on Zr at 1000°F, 10: 1775(R)

mass transfer of radioactivity from stainless steel by, 10: 3368(R)

purification, hazards of distillation-apparatus operation, 10: 3198

purification, Hg removal by amalgamation with Cu, 10: 1775(R)

reaction with graphite, 10: 2648

sliding contact of metals in, 10: 2092

surface tension, effect of oxide films on, 10: 206(J)

wetting of stainless steel with, 10: 576

## Sodium amercyl acetates

infrared spectra and structure of crystalline, 10: 994

## Sodium amides

crystal structure, 10: 910

- Sodium borates**  
heat capacity and thermodynamic properties of  $\text{NaBO}_2$  from 6 to 350°K, 10: 565
- Sodium borohydrides**  
proton magnetic resonance, 10: 2222(J)
- Sodium carbonates**  
analysis for boron, 10: 2272(R)
- Sodium chloride-aluminum chloride-lithium chloride-potassium chloride systems**  
phase studies, 10: 57
- Sodium chloride crystals**  
neutron scattering, 10: 3659(R)  
optical properties, x-radiation effects on, 10: 2767
- Sodium chloride-potassium chloride-zirconium chloride systems**  
phase studies, 10: 578
- Sodium chloride-potassium fluotitanate systems (liquid)**  
electrolysis, mechanism of crystal growth from, 10: 2766(R)
- Sodium chloride-zirconium chloride systems**  
electrical conductivity and phase studies, 10: 578
- Sodium chlorides**  
annealing of radiation damage in, 10: 3368(R)  
electric conductivity of concentrated aqueous solutions of, at high temperatures, 10: 2620(J)  
electrical conductivity of  $\text{BeCl}_2$ -NaCl system, 10: 593(J)  
heat capacities of (K,Na)Cl, mixed crystals, 10: 1255(J)  
radiation effects on the properties of solid, 10: 1944(R)
- Sodium chromates**  
ion exchange separation from hydrogen peroxide, 10: 2277  
labeled, paper electrophoretic determination of, in rat serum, 10: 83
- Sodium compounds**  
reaction mechanisms of, in biphenyl, amylsodium, Na benzophenone ketyl, and sodium naphthalene glycol with  $\text{UBr}_3$ , 10: 3124
- Sodium fluorides**  
phase studies, 10: 639(J)
- Sodium graphite reactors**  
fuel element storage and handling, 10: 3254
- Sodium hydrides**  
preparation by reaction of  $\text{H}_2$  with Na, 10: 56
- Sodium hydroxide-sodium nitrate-water systems**  
phase studies, 10: 1731(J)
- Sodium hydroxides**  
analysis for boron, 10: 2272(R)  
corrosive effects on Ni, 10: 2057
- Sodium hydroxides (liquid)**  
corrosive effects on alloys, metals, and ceramic materials, 10: 3282  
corrosive effects on Ni and ceramic materials, 10: 2702  
reactions with Ni and other container metals from 700 to 900°C, 10: 586  
solvent properties, decomposition stress of lead oxides in, 10: 1406(J)  
viscosity, 10: 780
- Sodium iodide crystals**  
efficiency, variation with  $\gamma$  energy, 10: 1507(R)  
emission of Tl-activated, effects of Tl concentration on, 10: 2114(J)  
light spectra effects on luminescence emission, 10: 2946(J)  
localization of  $\gamma$  emitters by, in a lead grid, 10: 1476(J)  
peak efficiency as a function of  $\gamma$  energy, 10: 3144(R)
- Sodium iodide crystals (cont'd)**  
thallium-activated, optical cement for, 10: 1891(J)
- Sodium isotopes  $\text{Na}^{23}$**   
formation cross section, from proton bombardment of Al, 10: 3660  
separation from  $\text{Na}^{24}$  by ion-exchange chromatography, 10: 2667(J)
- Sodium isotopes  $\text{Na}^{23}$**   
deuteron reactions (d,n), angular distribution of neutrons, 10: 1570(J)  
energy levels, 10: 3329(R)  
energy levels, study by inelastic proton scattering, 10: 1506(R)  
neutron scattering resonance, 10: 2496  
nuclear magnetic moments, 10: 2879(J)
- Sodium isotopes  $\text{Na}^{24}$**   
gamma rays, cross sections in Pb for, 10: 1911(J)  
preparation of metallic, and condensation of molecular beams of, 10: 3657  
separation from  $\text{Na}^{23}$  by ion-exchange chromatography, 10: 2667(J)
- Sodium-mercury alloys**  
heat transfer under turbulent flow, effect of gas entrainment on, 10: 763
- Sodium neptunyl acetates**  
infrared spectra and structure of crystalline, 10: 994
- Sodium nitrate-sodium hydroxide-water systems**  
phase studies, 10: 1731(J)
- Sodium oxides**  
production, and role in the corrosion of Ni by sodium hydroxide, 10: 2057
- Sodium phosphates**  
solubility, in sodium hydroxide solutions, 10: 1209
- Sodium plutonyl acetates**  
infrared spectra and structure of crystalline, 10: 994
- Sodium-potassium alloys**  
analysis for Cs and Rb by radioactivation and ion exchange chromatography, 10: 1232  
analysis for  $\text{O}_2$ , 10: 2258(R)
- Sodium tetraborates**  
(See also Borax)  
heat capacity and thermodynamic properties of crystalline and vitreous, at 6 to 350°K, 10: 564
- Sodium titanates**  
phase studies, 10: 639(J)
- Sodium tungstates**  
isotopic exchange between heavy oxygen  $\text{H}_2\text{O}$  and, 10: 1226(J)
- Sodium uranates**  
preparation by alkali reaction with  $\text{UO}_2(\text{NO}_3)_2$ , 10: 3524  
preparation from  $\text{UF}_6$ , 10: 3514  
production by neutralizing uranyl nitrate solutions, 10: 3523
- Sodium uranium(IV) fluorides**  
preparation and reduction to U metal, 10: 1318
- Sodium uranyl acetates**  
infrared spectra and structure of crystalline, 10: 994
- Soils**  
acid leaching of fission products from, for radiometric determination, 10: 1240  
adsorption of fission products by various types of, 10: 42(R)  
adsorptive properties for Sr, 10: 3183  
analysis for fission products, 10: 2631(J)  
erosion of various soil surfaces, measurements for contamination control, 10: 1895

## Soils (cont'd)

- fission product permeability of various types of, tracer study, 10: 555
- ion exchange reactions with fission products, effects on ground disposal of wastes, 10: 1327(R)
- moisture determination by neutron scattering measurements, 10: 2845(J)
- radioactivity, effect of cosmic radiation, 10: 1420(J)
- radiometric analysis for U and Ra content, 10: 2248(R)
- trace element content of, effects on plant and animal nutrition, 10: 1155(J)

## Solar batteries

- design, 10: 897(J)

## Solid solutions

- atomic displacements in Cu-Au, Co-Pt, Ni-Au, and Li-Mg alloys, determination by x-ray diffraction, 10: 1384
- formation and structure, theory, 10: 3285
- Hall Effect in, 10: 1385
- of metals, atomic arrangements, 10: 183(R)

## Solid state reactions

- kinetics, 10: 1335

## Solids

- eigenvalues, 10: 1459
- Einstein, Gr<sub>2</sub>neisen parameter determination from equation of state, 10: 1129
- equation of state, and inter-atomic force law, 10: 2953(J)
- equation of state, experimental determination, 10: 993
- molecular weight determinations, 10: 232
- radiation effects, 10: 1944(R)
- scattering of x rays by, theory, 10: 429(J), 430(J)
- shock wave propagation in, a literature survey, 10: 883
- sublimation, 10: 1334(J)
- sublimation, theory of, 10: 1817
- ultraviolet spectra of, 10: 1116

## Solutions

- freezing points, use of thermistors for measurement of, 10: 3022
- oxygen removal from, using fritted bubbling chambers, 10: 3106
- reduction by irradiation, 10: 1278(J)

## Solvent extraction processes

- amine extraction of uranium ores, 10: 3186(R)
- development of a small-scale pilot plant, 10: 117
- for extraction of Pu from reactor-irradiated U, 10: 2666(J)
- for plutonium, continuous operation, 10: 2332

## Solvents

- organic, physical properties, 10: 3563
- organic, radiosensitivity and optical and scintillation properties, 10: 3327(R)
- properties of, for use in recovery of U from extractant, 10: 683(R)
- Purex Process, vapor pressure, 10: 3487
- purification for spectrochemical analysis, 10: 3178(J)
- specific heat of, for Purex Process, 10: 2663

## Sources

(See Alpha sources; Beta sources; Gamma sources.)

## South Carolina

- geology, radiometric reconnaissance, 10: 2064

## South Dakota

- exploration and occurrence of U minerals, 10: 3130(R)

## South Dakota (Fall River Co.)

- exploration for U deposits in, 10: 1789(J)

## South Dakota (Harding Co.)

- exploration of Cedar Canyon in, 10: 1780(J)

## Southern Green River Desert Area (Utah)

- geology, 10: 800

## Southwest Research Inst., San Antonio.

- progress reports on polynuclear aromatic compounds for high temperature lubricants, 10: 737(R)

## Spallation products

- of zirconium, mass transfer during corrosion, 10: 2059

## Spark detectors

- for alpha particle counting, characteristics and design, 10: 2846(J)

## Spark shadowgraph photography

- equipment for, performance in making shadowgraphs of liquid jets, 10: 2

## Specific heat

- measurement of, of organic liquids, 10: 929
- methods of measurement, 10: 2724

## Spectra

(See also specific spectra, e.g. Cosmic ray spectra.)

- automatic development of mass, optimum method for, 10: 1866(J)
- molecular rotational, use of molecular beams in study of, 10: 1120(J)

## Spectrometers

- coaxial-cavity, for observation of nuclear quadrupole resonance, 10: 2878(J)
- data printing system for, 10: 3158
- design of Schumann, 10: 1886(J)
- development of spiral-orbit, and  $\mu$ -meson decay studies, 10: 1009(R)
- magnet power supply design, 10: 3206
- neutrino recoil, and study of  $A^{37}$  decay with, 10: 1513(J)
- scintillation, for isotope uptake measurements, 10: 972(J)
- scintillation, for medical applications, 10: 3144(R)
- scintillation, resolving ability of, 10: 253(J)

## Spectrophotometry

- deciphering of diffraction grating spectrographs by, 10: 1122(J)
- flame, of metals, 10: 1248(J)
- modification of Beer's law in analysis, 10: 79
- modifications of the Cary recording photometer for use in the range +180 to -180°C, 10: 1729(R)

## Spectroscopy

- analysis of  $N^{15}$  by improved methods of, 10: 2225(J)
- Hertzian, for observation of nuclear magnetic resonance, 10: 2874(J)
- purification of organic solvents for, 10: 3178(J)
- reciprocity problem of spectral analysis for Schrodinger's equation, 10: 2807(J)

## Sperm

- radiosensitivity of bull, 10: 1169(R)

## Spheres

- neutron flux distribution in U, effect of neutron velocity distribution on, 10: 3748
- thermal expansion and stresses of rapidly heated, 10: 1559

## Spin

(See Nuclear spin.)

## Spleen

- erythrocyte storage capacity, 10: 3165(R)
- homogenates, effects on hemolysin production in irradiated mice, 10: 522(J)



## Spleen (cont'd)

- homogenates, protective effects against  $\beta$ -induced skin injury in rats, 10: 2594(J)
- oxygen consumption in, effects of total-body irradiation on, in rats, 10: 37(J)
- protective effects of homogenates of, against radiation injuries in mice, 10: 1161(R)
- x-ray-induced lesions in rat, 10: 1178(J)

## Spontaneous fission

- of thorium, half life, 10: 335(J)

## Spray columns

- cost of, for cooling  $H_3PO_4$ , 10: 2749
- mass transfer between liquid drops and continuous liquid phase, 10: 1733(J)

## Stable isotopes

(See also specific stable isotopes.)

- chemical separation from isotope collectors in electromagnetic process, 10: 1293

## Stack disposal

- in control of radioactive contamination, 10: 1713(J)
- nitrogen oxides removal, 10: 3292
- of radioargon, effectiveness, 10: 1329

## Staining

- of colorless living organisms in macro-photography, 10: 1979(J)

## Stainless steel

- adsorption of fission products, 10: 3488(R)
- analysis for As, 10: 2627
- bonding, surface treatment for adhesive, 10: 191
- boron, for reactor control rods, physical properties and corrosion resistance of, 10: 3716
- brazing, 10: 864
- chromium alloy coatings for, corrosion and oxidation resistance of, 10: 842
- corrosion, 10: 687(R), 3593
- corrosion, effects of radiation on, 10: 2252(R)
- corrosion by boiling 65%  $HNO_3$ , 10: 3596
- corrosion by distilled and borated deionized  $H_2O$  at temperatures up to 500°F, 10: 3006
- corrosion by Dowtherm A-alkylbenzene mixtures, 10: 3005
- corrosion by  $HF - H_2SO_4$  solutions of synthetic Hanford waste, 10: 3597
- corrosion by  $H_2SO_4$  and  $HF - HNO_3$  systems, 10: 3129
- corrosion by liquid U-Bi alloys and LiCl-KCl eutectic, 10: 2440(R)
- corrosion by pile water, 10: 2432
- corrosion by uranyl nitrates, 10: 2430
- corrosion-erosion of, 10: 1347
- corrosion by 500 and 600°F water, 10: 1806
- corrosion in Hg, 10: 2297
- corrosion in pitchblende leach liquors, 10: 3599
- corrosion in sulfamic acid solutions, 10: 2433
- corrosion of type 347, 10: 147
- corrosion protection by anodic polarization, 10: 793(J)
- decontamination of, exposed to Purex Process solution, 10: 3607(R)
- decontamination reagent for, 10: 3489(R)
- development for high temperature use, 10: 835
- dimensional stability and welding to carbon steel, 10: 2717
- ductility, effects of brittle skins on, 10: 2723
- effect of welding on the stabilization and corrosion of 18% Cr-8% Ni, 10: 174
- electrolytic decontamination, 10: 2329(R)

## Stainless steel (cont'd)

- equipment for obtaining tensile properties of irradiated, at elevated temperatures, 10: 1446
- fusion welding and cold and hot forming, 10: 1366(R)
- hardness and tensile properties of irradiated, 10: 3035(R)
- lubrication of, with  $MoS_2$ , 10: 203(R)
- mass transfer of radioactivity from, in corrosion loops, 10: 3368(R)
- mechanical properties during welding and/or subsequent high temperature service, 10: 1831(J)
- neutron-activated,  $\gamma$  spectrum of, 10: 2142(R)
- neutron streaming, effects of composition on, 10: 2557
- properties, niobium and titanium effects on, 10: 1401(J)
- rare-earth separation by fluoride precipitation, 10: 1242(R)
- tensile strength of brazed joints, 10: 2071
- thermal cycling and stress fatigue, summary report on, 10: 1372
- thermal shock due to quenching by liquid Na, 10: 1775(R)
- welding hafnium to, preliminary attempts, 10: 2438
- welds, strength of, 10: 825(R)
- welds of, hot cracking, 10: 849
- wetting with molten Na, 10: 576

## Stainless steel (austenitic)

- dimensional stability and mechanical properties, 10: 1809

## Stainless steel (ferritic)

- dimensional stability and mechanical properties, 10: 1809

## Standard Oil Co. of Indiana, Whiting.

- progress reports on development and evaluation of high temperature greases, 10: 2055(R)

## Stanford Research Inst., Menlo Park, Calif.

- progress reports, 10: 2019(R)
- progress reports on thermodynamic properties of molten salts, 10: 635(R)

## Star No. 1 Claim (Colo.)

- occurrence in Atkinson Creek Quadrangle, 10: 1360(J)

## Statistical Mechanics

(See Mathematics.)

## Statistics

- applications to source and special nuclear materials accountability, 10: 3029
- applied to results of radiometric analysis of urine samples, 10: 2286
- of isotope mixtures, 10: 936(J)
- quantum, distribution function, power series solutions, and transformation functions for, 10: 488
- sampling studies on reliability, applied to guided missiles, 10: 2109

## Steam

- corrosive effects on Zr, alloying effects, 10: 2072
- corrosive effects on Zr and Zr alloys, effects of temperature and pressure on, 10: 2077
- generation from liquid metals at high heat fluxes, 10: 772(J)
- superheated, corrosive effects on Al alloys, 10: 2705(J)

## Steam generators

(See Boilers.)

## Steam-water systems

- density and velocity measurements on boiling, 10: 2054
- heat transfer to, during forced flow through heated tube, 10: 2054
- pressure effects on velocity and density, 10: 3352

## Stearic acid films

- preparation of, containing  $Co^{60}$ , 10: 1106(J)

## Steel

(See also specific steels, e.g. Boron steel.)

- casting, procedures for risering, 10: 2725
- corrosion by 1-propyl mercaptan, 10: 3462
- corrosion in 500 and 600°F water, 10: 1806
- corrosion inhibition by perhenates, 10: 2710(J)
- corrosion inhibition by pertechnetates, 10: 2709(J)
- effects of temperature on the ductility of, in the presence of fractures, 10: 182
- erosive effects of shot, on graphite, 10: 3471
- gamma scattering, 10: 2549
- grain size determination by ultrasonic methods, 10: 854
- impact properties of quenched and tempered alloy, effect of process variables on, 10: 1381
- mechanical properties of AISI 4340 and 4350, effects of austempering, MX martempering, and interrupted quenching, 10: 1395
- mechanical properties of cold-worked, handbook and bibliography on, 10: 1821
- molten, elimination of C from, kinetics of, 10: 876(J)
- neutron streaming, effect of composition on, 10: 2557
- plastic deformation, change of Poisson's coefficient during, 10: 870(J)
- plastic deformation, effect of stress concentration and impurity content on, 10: 1813
- spectrophotometric analysis for Mo, Cu, P, Ni, Cr, Mn, and Si in, 10: 860
- spot welding, shunting currents in series, 10: 1832(J)
- thermal conductivity of SAE 1010, 10: 2724
- thickness measurements of,  $\gamma$  gage for, 10: 143(J)
- transformation diagrams of special treatment, 10: 1382
- welded joints in low alloy, fatigue and static properties, 10: 2713

## Sterilization

- of foodstuffs, by exposure to radiation, a review, 10: 29(J)
- of meat, distribution problems associated with, 10: 512
- radioinduced in meat, design of facility for, 10: 2579

## Stirring apparatus

- design and performance of gas-lift circulators, 10: 3337

## STR

(See Bulk Shielding Facility.)

## Strain gages

(See also Extensometers.)

- performance tests of foil-type, for large strains at high fluid pressures, 10: 141

## Streptomycin

- protective effects against radiation injuries in hamsters, 10: 1191(J)

## Stress analysis

(See also Mechanics.)

- biaxial alternating stresses and simple combinations of static and alternating stresses, tests, 10: 778
- of circular plates with centrally applied moments, 10: 888
- Einstein solids under finite strain, Grüneisen parameter determination, 10: 1129
- pipng systems, evaluation of methods, 10: 119

## Strontium

- adsorption and retention by soil, 10: 3183
- bone deposition, effects of dietary level in experimental animals, 10: 2973
- determination, 10: 3433
- determination in urine, techniques for, 10: 3143(R)

## Strontium (cont'd)

- elastic scattering of 80-kev neutrons by, comparison of experimental and theoretical data, 10: 428(J)
- electrochemical properties, 10: 3503
- excretion in monkeys, tracer study, 10: 1696(R)
- ion exchange between aqueous chlorides and montmorillonite clays, 10: 2039(J)
- ion exchange separation of, from milk, tracer study, 10: 726
- metabolism in rats, 10: 1160(R)
- metabolism in rats, effects of irradiation, 10: 3408(R)
- metabolism of, by barley and tomato plants, factors affecting, tracer study, 10: 554
- separation from other alkaline earth metals by paper chromatography, 10: 1307(J)
- spectrographic determination in barium nitrate, 10: 1234
- spectrographic determination in plant and food samples, 10: 2973
- spectrophotometric determination of, in sea water, 10: 1241
- tissue distribution in Habrobracon, tracer study, 10: 2609(J)
- tissue distribution in marine organisms, tracer study, 10: 1718(R)
- uptake by barley, factors affecting, 10: 508

## Strontium isotopes

- electromagnetic separation, 10: 3026(R)
- radiometric determination of, in urine, 10: 612

Strontium isotopes  $\text{Sr}^{85}$ 

- gamma reactions ( $\gamma, n$ ), energy, 10: 343(J)

Strontium isotopes  $\text{Sr}^{86}$ 

- decay scheme, 10: 474(J)

Strontium isotopes  $\text{Sr}^{87}$ 

- age determination of marine carbonates and shells by, 10: 806

Strontium isotopes  $\text{Sr}^{88}$ 

- energy levels, 10: 3144(R)

Strontium isotopes  $\text{Sr}^{89}$ 

- decay,  $\gamma$ -ray branching, 10: 451(J)
- formation cross section from deuteron bombardment of U, 10: 2239(J)
- formation cross sections of, from  $\text{U}^{238}$  bombarded with 19- to 190-Mev deuterons, 10: 2237
- plant metabolism, 10: 2970
- uptake of, in earthworms, 10: 43(R)

Strontium isotopes  $\text{Sr}^{90}$ 

- as beta sources, dosimetry of, 10: 956
- radiometric determination of, in urine, 10: 42(R)
- skeletal deposits of, in vivo  $\text{Y}^{90}$  production from, in young dogs, 10: 558(J)
- tissue distribution in cats, 10: 1161(R)

## Structural engineering

- pressure vessels, stresses from radial loads and external moments, 10: 1777(J)
- problems associated with uranium mining, 10: 542(J)

## Structural materials

(See Building materials.)

## Structural panels

- crippling strength of, with material properties, correlation of, 10: 2722
- effects of shock waves on, 10: 782(J)

## Structures

- effects of shock waves on, 10: 782(J)

## Structures (cont'd)

stress distribution, effect of rapid creep on, 10: 186

## Styrene polymers

paramagnetic resonance in, x-irradiation effects on, 10: 2217(J)

radiation dose measurement by increase of optical absorption of, 10: 1478(J)

thermal diffusion in various organic solvents, 10: 2621(J)

## Styrenes

polymerization techniques for preparation of scintillators, 10: 1872

## Submarine Intermediate Reactor

cooling system, effect of impure cover gas on operation, 10: 120(R)

cooling system, removal of radioactive sodium, 10: 120(R)

free convection in rotating plugs, 10: 2883

heat transfer systems, testing, 10: 1775(R)

## Subsonic flow

within range of supersonic velocities, limited in downward flow by sudden increase in density terminating within the flow, 10: 774(J)

## Sugars

plant metabolism, tracer study, 10: 3327(R)

## Sulfamic acid

corrosive effects on stainless steel, 10: 2433

potentiometric determination, 10: 1237

## Sulfate ions

dissociation quotient of  $\text{HSO}_4^-$ , determination of, 10: 592(J)

reactions of  $\text{S}_2\text{O}_8^{2-}$  with  $\text{Ce}^{3+}$ , kinetics and mechanisms, 10: 104(J)

## Sulfates

determination of trace amounts in  $\text{H}_2\text{O}$ , 10: 80

ion exchange of, equilibrium constant for, 10: 2987

metabolism, effects of total-body irradiation in mice and rats, tracer study, 10: 1183(J)

nephelometric determination of trace amounts in reagent-grade  $\text{CaCO}_3$ ,  $\text{Na}_2\text{CO}_3$ , and  $\text{KCl}$ , 10: 611

photometric titration in HRT solutions, 10: 3177

volumetric determination of very small concentrations of, 10: 62

## Sulfur

chemical determination in  $\text{BCl}_3$ , 10: 3420

as corrosion inhibitor when admixed to oils, tracer study, 10: 2041(J)

determination in organic compounds, 10: 571(R)

gamma rays excited by inelastic scattering of 3.7-Mev neutrons in, 10: 3034(R)

inelastic neutron scattering,  $\gamma$  rays excited by, 10: 432(J)

neutron elastic scattering cross sections, 10: 1088

neutron total cross sections, comparison of measured and calculated values, 10: 2146

## Sulfur compounds

preparation and properties of organic, for use in elastomers, 10: 738(R)

preparation of phenothiazin derivatives, 10: 575(R)

## Sulfur dioxide-hydrofluoric acid systems

phase studies, 10: 636

## Sulfur fluorides

physical properties of  $\text{SF}_6$ , 10: 1262(J)

physical properties of  $\text{SF}_6$ -propane system, 10: 1263(J)

## Sulfur isotopes

electromagnetic separation, 10: 3026(R)

Sulfur isotopes  $\text{S}^{33}$ 

energy levels, 10: 2150(J)

Sulfur isotopes  $\text{S}^{36}$ 

bremsstrahlung spectra, internal and external, 10: 477(J)

energy levels, 10: 2150(J)

ion pair production in air, energy levels, 10: 2840(J)

## Sulfuric acid

adsorption on platinum coated platinum, investigation with labeled atoms, 10: 736(J)

corrosive effects on Zr and stainless steel, 10: 3129

electrolytic recovery from barren leach liquors, 10: 2035

free-radical formation in, effect of  $\gamma$  irradiation on, 10: 2218(J)

recovery from waste solutions by ion-exchange, 10: 724(R)

solubility of Zr and stainless steel in, 10: 3129

solvent properties for  $\text{UO}_3$ , 10: 1325(J)

## Sulfuric acid-copper sulfate systems

corrosive effects on weld deposits, 10: 147

## Sulfuric acid-hydrofluoric acid systems

corrosive effects on Ni, Ni alloys, and stainless steel, 10: 3597

## Sulfuric acid-uranium(VI) oxide systems

phase studies, 10: 1325(J)

## Sulfuryl fluoride

anodic structure of, formation by electrolysis of fluosulfonic acid in HF, 10: 1751(J)

## Sun Flower Claim

geophysical exploration, geology, 10: 1350

## Supai Formation (Nev.)

geology, 10: 1358

## Superconductivity

theory, 10: 1622(J)

of zirconium alloys, transition temperatures for, 10: 900(J)

## Supersonic airfoils

skin friction and heat transfer coefficients, 10: 127

## Surface-active agents

adsorptive properties of Pd-C systems for diborane, 10: 2624(J)

effect on stability of colloidal systems, 10: 53

## Surface friction

of gases at low pressure, 10: 3371(J)

## Surface properties

of molybdenum-zirconium alloy studied with a field emission microscope, 10: 852

transmission coefficient of metal surfaces, barrier analysis of, 10: 1400(J)

## Surface tension

of liquid  $\text{He}^3$  from 0.93 to 3.34°K, 10: 309(J)

## Surface waters

analysis of water from Missouri and Mississippi Rivers for U content, 10: 3026(R)

uranium recovery, 10: 3550

## Surfaces

area measurement of, 10: 242

galling, thermal aspects of, 10: 1840

## Survey meters

(See Radiation detection instruments (Ion current type); Rate meters.)

## Switches

commutating mercury jet, design, 10: 1859



## Switches (cont'd)

design, for use in radiation detectors, 10: 1669(P)

## Synchrocyclotrons

beam extraction with nonlinear deflector, theoretical analysis, 10: 2186(J)  
 beams, development of electrostatic and magnetic deflectors, 10: 2453  
 beams, experimental results of extraction technique, 10: 1084(J)  
 beams, theory of extraction, 10: 1083(J)  
 design, performance, and applications of, 10: 413(J)  
 magnet design and measurements, 10: 2451  
 magnet measurements and health physics program, 10: 2452  
 particle detection, development of circuits for, 10: 2907(J)  
 proton-beam extraction system of 450-Mev, 10: 2906(J)

## Synchrotrons

alternating gradient, design, 10: 1(R)  
 beam analysis and absorption, equipment for determinations, 10: 3166  
 beams of, average power spectrum and angular distribution determinations, 10: 1116  
 design and characteristics of Saclay, 10: 415(J)  
 design of a 25-Bev alternating gradient, 10: 410(J)  
 design of alternating gradient, 10: 3143(R)  
 design of buildings and experimental facilities, 10: 411(J)  
 electron, design considerations for 100-Mev, 10: 416(J)  
 electron, Glasgow Univ., 340-Mev, 10: 421(J)  
 electron beams in strong-focusing, scattering by residual gas, 10: 2184(J)  
 influence of eddy currents in the vacuum chamber, 10: 407  
 magnet design, 10: 2498  
 magnet models, residual fields in, 10: 409  
 magnetic fields of CERN, measurements of, 10: 1076  
 magnets, a-c and d-c models, 10: 2547  
 non-linear effects in, theory, 10: 1583  
 operation, 10: 3863  
 operation and maintenance of MIT, 10: 1903(R)  
 orbit stability in alternating-gradient, with nonlinear restoring forces, theoretical analysis, 10: 2179  
 orbital properties of strong-focusing, electron analogue accelerator for, 10: 1592(J)  
 particle capture and acceleration, theory of, 10: 417(J)  
 particle orbits, influence of magnetic end effects on stability, 10: 1935  
 proton, mercury-arc converters for power supplies of, 10: 408  
 proton, stability and focusing problems in, 10: 419(J)  
 proton scattering by residual gases in, and proton losses in, 10: 2905(J)  
 stability of betatron oscillations, 10: 1458  
 theory of optically focused, 10: 1080  
 theory of particle orbits in alternating gradient, 10: 412(J)  
 ultraviolet radiation from, spectral and angular distribution, 10: 1117  
 x-ray beams from, angular spread of, 10: 2180

## Synthetic rubber

(See Elastomers.)

## T

## Tables

(See Constants and conversion factors; Mathematical tables.)

## Tam O'Shanter Mine (Nev.)

exploration, 10: 1358

## Tantalum

chemical determination in B, 10: 3421  
 corrosion by hydriodic acid, 10: 3594  
 corrosion in Hanford process solutions, 10: 3595  
 filaments weight loss of heated, effect of O<sub>2</sub> on, 10: 2476  
 neutron elastic scattering cross sections, 10: 1088  
 neutron total cross sections, comparison of measured and calculated values, 10: 2146  
 nuclear reactions with 5.7-Bev protons, 10: 1729(R)  
 occurrence in minerals and rocks, 10: 1817  
 production and industrial uses, 10: 177  
 proton reactions, 10: 3104  
 proton scattering, asymmetries in double charge-exchange, 10: 1939  
 separation from Nb, 10: 3196(R)  
 solvent extraction from Nb, 10: 2989, 3031

## Tantalum carbides

preparation and chemical analysis, 10: 3590

## Tantalum isotopes

relative abundance, 10: 2494(R)

Tantalum isotopes Ta<sup>180</sup>

decay, 10: 2939(J)  
 identification and half-life determination, 10: 2494(R)

Tantalum isotopes Ta<sup>181</sup>

conversion electron correlation of Hg<sup>197</sup> and, 10: 1957(J)  
 conversion electrons from electric excitation of, 10: 2153(J)  
 decay, directional correlation in, 10: 1955(J)  
 decay scheme, 10: 474(J)

Tantalum isotopes Ta<sup>182</sup>

radioactivity, 10: 3659(R)

Tantalum isotopes Ta<sup>186</sup>

decay characteristics, 10: 1108(J)

## Tantalum minerals

occurrence, 10: 1817

## Tantalum-vanadium alloys

phase studies, 10: 3196(R)

## Tantalum-zirconium alloys

electric and thermal conductivity, 10: 2437  
 heat treatment and phase studies, 10: 1370(R)  
 phase studies, 10: 3196(R)  
 tensile properties, 10: 1804

## TBP Process

corrosion of stainless steel equipment by boiling HNO<sub>3</sub>, 10: 3596  
 waste disposal, effects of viscosity of neutralized and concentrated raw slurry, 10: 2399

## Technetium

electrode potentials, 10: 71(J)  
 neutron activation analysis for naturally occurring Tc<sup>98</sup>, 10: 2625(R)

Technetium isotopes Tc<sup>97</sup>

formation from disintegration of Ru<sup>97</sup> and half life, 10: 3740  
 gamma emission and nuclear level scheme, 10: 457(J)

Technetium isotopes Tc<sup>98</sup>

determination of naturally occurring, by neutron activation analysis, 10: 2625(R)  
 neutron-activation determination in minerals and other natural sources, 10: 170(J)

Technetium isotopes Tc<sup>99</sup>

neutron cross sections, 10: 2625(R)  
 x-ray spectrum, 10: 2937(J)

- Technetium isotopes Tc<sup>105</sup>**  
 decay properties, 10: 2881(J)
- Teflon**  
 (See Ethylene, tetrafluoro- polymers.)
- Tellurium**  
 extraction from hydrochloric acid, 10: 1903(R)  
 solvent extraction from HCl solutions with  $\beta$ ,  $\beta$ -dichloroethyl ether, 10: 3329(R)
- Tellurium isotopes**  
 electromagnetic separation, 10: 3026(R)  
 gamma yields from Coulomb excitation, 10: 3144(R)  
 purification, 10: 3026(R)
- Tellurium isotopes Te<sup>120</sup>**  
 beta and gamma spectra, 10: 570(R)
- Tellurium isotopes Te<sup>121</sup>**  
 angular correlation in two-step transition, 10: 2154(J)
- Tellurium isotopes Te<sup>123</sup>**  
 angular correlation in two-step transition, 10: 2154(J)  
 Coulomb excitation and energy levels, 10: 2149(J)  
 radioactivity, 10: 1601
- Tellurium isotopes Te<sup>125</sup>**  
 Coulomb excitation and energy levels, 10: 2149(J)
- Tellurium isotopes Te<sup>127</sup>**  
 decay, 10: 1602(J)
- Tellurium isotopes Te<sup>129</sup>**  
 decay, 10: 331(R), 1602(J)  
 gamma radiation from, 10: 2941(J)
- Tellurium-manganese systems**  
 magnetic properties, 10: 1411(R)
- Tellurium-selenium systems**  
 molten, temperature effect on density and electroconductivity, 10: 1405(J)
- Temperature**  
 body, effects on radiosensitivity of rats, 10: 541(J)  
 cryoscopic measurements, application of thermistors for, 10: 3022  
 effects on radiosensitivity of skin, 10: 1190(J)  
 measurement, basic limitation in, 10: 3136
- Temple Mountain District (Utah)**  
 exploration, geology, and mineralogy, 10: 1785(R)
- Tennessee**  
 exploration of Chattanooga shale for U, 10: 2062(R)  
 geology, radiometric reconnaissance, 10: 2064
- Tennessee Eastman Corp., Oak Ridge, Tenn.**  
 progress reports on chlorination of UO<sub>3</sub>, 10: 3527(R)
- Tennessee. Univ., Knoxville.**  
 progress reports on agricultural research, 10: 1169(R)  
 progress reports on Chattanooga Shale as source of U, 10: 2062(R)
- Tennessee Valley Authority, Wilson Dam, Ala.**  
 progress reports on utilization of Florida leached zone material, 10: 2259(R), 2260(R), 2261(R), 2262(R), 2263(R), 2264(R), 2265(R), 2266(R), 3418(R)
- Tensile properties**  
 equipment for obtaining, of irradiated materials at elevated temperatures, 10: 1446
- Terbium**  
 effects on tissue distribution of Tb<sup>160</sup> in rats, 10: 3165(R)  
 metabolism and excretion rates of, in rats, 10: 1694
- Terbium isotopes**  
 energy levels, 10: 1903(R)  
 internal conversion coefficients for the L subshell, 10: 1518  
 proton excitation, 10: 1611(J)
- Terbium isotopes Tb<sup>160</sup>**  
 beta spectrum, analysis, 10: 3653(R)  
 coincidence study of radiation from, 10: 471(J)  
 decay schemes, 10: 2496  
 radioactivity of, upper limits of partial spectra of, 10: 1102(J)
- Terphenyl**  
 gamma-induced luminescence, oxygen quenching, mechanism, 10: 899(J)  
 quantitative analysis by compressed pellet infrared method, 10: 3333  
 radiolysis and thermal decomposition, heat transfer coefficients, and analytical methods of determination, 10: 2258(R)
- Testes**  
 (See Gonads.)
- Tetraethylene glycol, dibutoxy-**  
 solvent properties for TTA, 10: 2333
- Tevo Sisters Mine (Colo.)**  
 mineralogy, U occurrence, 10: 1363(J)
- Textiles**  
 cotton, thermal shielding properties against cutaneous burns in swine, 10: 2243  
 thermal shielding properties, 10: 3096
- Thallium**  
 low-temperature properties, 10: 2746(J)
- Thallium chlorides**  
 fused, transport numbers, 10: 570(R)  
 solvent extraction with organic solvents, 10: 569(R)  
 transport numbers, 10: 569(R)
- Thallium ions**  
 coprecipitation with AgCl, distribution coefficients, 10: 732(J)
- Thallium isotopes**  
 search for Tl<sup>208m</sup>, 10: 3295
- Thallium isotopes Tl<sup>185</sup>**  
 production by deuteron reaction in Hg<sup>180</sup>, and decay properties, 10: 2201(J)
- Thallium isotopes Tl<sup>197</sup>**  
 decay properties, 10: 2201(J)
- Thallium isotopes Tl<sup>198</sup>**  
 decay properties, 10: 2201(J)
- Thallium isotopes Tl<sup>203</sup>**  
 decay scheme, 10: 474(J)  
 lifetime of the 279-kev state, 10: 1411(R)  
 separation in calutron, 10: 3625
- Thallium isotopes Tl<sup>204</sup>**  
 beta spectrum, analysis, 10: 3653(R)
- Thallium isotopes Tl<sup>206</sup>**  
 separation in calutron, 10: 3625
- Thallium isotopes Tl<sup>208</sup>**  
 decay, 10: 2938(J)  
 energy level transitions in, lifetimes of, 10: 3144(R)  
 spectrum and multipole order of  $\gamma$  rays, 10: 1543(J)
- Thenoyltrifluoroacetone**  
 (See Acetone, thenoyltrifluoro-.)
- Therapy**  
 (See Antibiotic therapy; Radiotherapy.)

## Thermal conductivity

(See also Heat transfer.)

coefficients of, equipment for determination of, to 1700°F, 10: 789

measurement for Zr and Sn-Zr alloys, apparatus for, 10: 3366

theory, 10: 2724

theory and equipment for measuring, 10: 3479

## Thermal convection

(See Convection.)

## Thermal cycling apparatus

design and performance, 10: 777

## Thermal diffusion

in liquid metal systems, theory, 10: 2089(J)

in liquids, principles and application to separation processes, 10: 1733(J)

in liquids, theory, 10: 2621(J)

## Thermal injuries

(See Burns.)

## Thermal neutrons

absorption in U and  $U_3O_8$ , 10: 2565

activation breakdown of In foils by, 10: 2863(J)

density, ratio of resonance neutron density to, 10: 1495

diffusion length in U cylinder, 10: 3760

diffusion of, from pulsed source of fast neutrons, 10: 1005(J)

dosage determinations, 10: 3030, 3177

flux distribution, originating from fast neutron line source, 10: 2861(J)

scintillation spectrometry, 10: 1503(J)

spatial distribution of Po-Be, in  $H_2O$ -Zr mixtures, 10: 431(J)

spectra measurement in a thermal pile, 10: 947

## Thermal radiation

(See also Infrared radiation.)

effects on materials, 10: 1097

pathological effects of superimposed exposures to, on porcine skin, 10: 3253

pathological effects on porcine skin, 10: 1984

pathological effects on skin of swine, 10: 2243

## Thermal radiation shielding

effectiveness of cotton fabrics against cutaneous burns of swine, 10: 2243

effectiveness of sillimanite and alundum cement, 10: 3741

effectiveness of various fabrics, 10: 3096

## Thermal radiation sources

performance of the 36-in. Navy searchlight source and the Mitchell source as, 10: 1097

## Thermal reactors

(See also specific reactors, e.g. Brookhaven Reactor.)

critical conditions for multiplying-slab, with non-multiplying reflector, 10: 3727

fission product poisoning in, 10: 1564(J)

neutron distribution in homogeneous and heterogeneous, 10: 2898(J)

neutron flux and cross sections in, calculations for, 10: 1065(J)

neutron spectra measurement, 10: 947

operating time, dependence on neutron flux and absorption cross section of fuel, 10: 1930(J)

## Thermal shielding

(See Thermal radiation shielding.)

## Thermal stresses

determination of, in uniformly distributed volume heat source, 10: 884

## Thermocouples

calibration of, under irradiation, 10: 776

radiation effects, in MTR, 10: 2918

## Thermodynamic properties

tables of enthalpy and heat capacity for various substances, 10: 2616

## Thermodynamics

calculation of specific heat, entropy, enthalpy, and free energy on Oracle, 10: 3211(R)

## Thermoelectric properties

equipment for measuring, 10: 3479

## Thermonuclear explosions

blast forces from, effects on structures, 10: 782(J)

fall-out from, pathological effects, 10: 16

fall-out monitoring at Washington, D. C., from Jan. 1951 to May 1955, 10: 1704

## 6-Thiioctic acid

(See Caprylic acids, thio-.)

## Thiocyanate complexes

for separation of Zr from H, 10: 2268

## Thiols

exchange reactions with deuterium and with water, corrosive effects on steel, solubility in water, and solubility of water by, 10: 3462

## Thomas Range (Utah)

geophysical exploration, U mineralization, 10: 803

## Thorium

allotropy and electrical resistance, effect of impurities on, 10: 1369

analysis for Fe, 10: 2303

analysis for O picked up in casting, 10: 3427

annealing and tensile properties, 10: 3479

bibliography on, 10: 2727

chemical and spectrographic analysis for impurity elements, 10: 3330

chemical reactions with water vapor, 10: 62

colorimetric determination in oxalic acid leach solutions of U, 10: 3536

colorimetric determination of microgram quantities, 10: 3428

corrosion by air, 10: 3356

corrosion in air and  $H_2O$ , 10: 3598corrosion in  $H_2O$  at 100 and 200°C, effect of alloying additions on, 10: 2056

delayed neutron yields from fast fission, 10: 330

determination in ores, manual of analytical methods for, 10: 1747(J)

determination in thorium nitrate solutions, 10: 3431

determination in Th-U alloys, 10: 3549

determination of, and U concentration ratios in Indian rocks and minerals, 10: 1744(J)

distribution between salt and metal phases, 10: 2518(R)

electrodeposition from acid solutions, 10: 3275

electrodeposition from fused-salt baths, 10: 1367

energy band structure calculations, 10: 3405(R)

exposure to, pathological effects, 10: 2597(J)

extraction by butyl phosphates from bone samples, 10: 3327(R)

fission by 37.5-Mev  $\alpha$  particles, 10: 2500(R)

hardness, effect of electron irradiation on, 10: 3405(R)

mechanical and metallurgical properties, 10: 632

mechanical properties, effects of alloying, cold work, and aging on, microstructure, 10: 2715

metallography, microstructure, and electrolytic etching, 10: 1364

metallography, notes from fifth metallographic conference, 10: 855



## Thorium (cont'd)

- neutron absorption cross sections due to impurity elements, 10: 3330
- neutron flux distribution in fuel rods of, 10: 3379(R)
- physical and mechanical properties, summary of data on, 10: 3605
- physical properties and permissible limits, 10: 2244
- production from monazite sands, 10: 568(R)
- radiation dosage determinations, 10: 2811
- radiation effects, 10: 3738
- radiometric determination in low-grade ores, 10: 2392
- recovery from slags, 10: 3484
- resistivity recovery of, and energy bands in face-centered cubic, 10: 3307(R)
- resonance integral of lumps, 10: 2511
- rolling, personnel exposure to radioactive dust from, 10: 1188
- separation by precipitation with phenolic acids, 10: 2638(J)
- separation from aqueous solutions of heavy elements by cation exchange, 10: 3053(P)
- separation from Bi, 10: 2440(R)
- separation of Pb and Bi from, in aqueous  $\text{Cl}^-$  and  $\text{NO}_3^-$  solutions by electrodeposition, 10: 1306(J)
- solubility of C in, 10: 2720
- solvent extraction from monazite sulfate solution, 10: 3196(R)
- spectrographic determination in ores, 10: 1250(J)
- spectrometric determination in organic and aqueous solutions, 10: 1249(J)
- spontaneous fission, half life, 10: 335(J)
- spot welding over range of welding conditions, 10: 3194

## Thorium alloys

- corrosion in air and  $\text{H}_2\text{O}$ , 10: 3598
- corrosion in  $\text{H}_2\text{O}$  at 100 and 200°C, 10: 2056
- mechanical properties, effects of alloying, cold work, and aging on, microstructure, 10: 2715

## Thorium-aluminum alloys

- corrosion in air and  $\text{H}_2\text{O}$ , 10: 3598

## Thorium-beryllium alloys

- corrosion in air and  $\text{H}_2\text{O}$ , 10: 3598

## Thorium Breeder Reactor

- power costs, effects of error in two-group constants on power costs, 10: 3706

## Thorium carbides

- preparation and chemical analysis, 10: 3590

## Thorium-carbon systems

- hardness and effects of heat treatment on lattice constants, 10: 2720

## Thorium chlorides

- magnesium reduction at 500°C, 10: 3345

## Thorium(IV) chlorides

- activity and osmotic coefficients of aqueous solutions at 25°C, 10: 1734(J)
- preparation by chlorination of  $\text{ThO}_2$ , 10: 3196(R)

## Thorium complexes

- with oxalates, determination by thermometric and cryoscopic titrations, 10: 2637(J)

## Thorium compounds

- chemical properties, 10: 3416
- colorimetric analysis for Fe, 10: 3429

## Thorium fluorides

- volumetric determination, effect of pH on, 10: 1743(J)

## Thorium(IV) fluorides

- hydrates of, preparation and x-ray-diffraction analysis, 10: 114(J)
- preparation by thermal degradation of the hydrate, 10: 1256
- preparation of anhydrous, 10: 3761
- production from  $\text{Th}(\text{NO}_3)_4 \cdot 4\text{H}_2\text{O}$  pilot plant, 10: 3335

## Thorium-hafnium alloys

- phase studies, 10: 3196(R)

## Thorium ions

- hydrolysis, effect of concentration on, 10: 68(J)

## Thorium isotopes

- atomic spectroscopy, isotopic shift in, 10: 2470

Thorium isotopes ( $\text{ThC}$ )

- (See Bismuth isotopes  $\text{Bi}^{212}$ .)

Thorium isotopes ( $\text{ThC}^{11}$ )

- (See Thallium isotopes  $\text{Tl}^{208}$ .)

Thorium isotopes  $\text{Th}^{227}$ 

- alpha and electron spectra, 10: 3104
- gamma spectra, 10: 1729(R)
- tissue distribution following puncture wound to finger, 10: 1161(R)

Thorium isotopes  $\text{Th}^{228}$ 

- metabolism and pathological effects in dogs, 10: 1160(R)

Thorium isotopes  $\text{Th}^{230}$ 

- alpha spectra, 10: 1729(R)
- decay properties and energy levels, 10: 2209(J)
- determination in fission products, 10: 1230
- radiometric determination in U samples, 10: 81(R)

Thorium isotopes  $\text{Th}^{232}$ 

- alpha decay, energy of  $\text{Ra}^{228}$  first excited state from, 10: 464(J)
- half lives, 10: 3144(R)

Thorium isotopes  $\text{Th}^{233}$ 

- thermal neutron fissionability, 10: 2567

Thorium isotopes  $\text{Th}^{234}$ 

- beta- $\gamma$  coincidences and decay scheme, 10: 2933(J)
- concentration from uranium nitrate solutions, 10: 3513

## Thorium-niobium alloys

- phase studies on, 10: 840

## Thorium nitrates

- analysis for Th and nitric acid, 10: 3431
- fluorination to  $\text{ThF}_4$ , pilot-plant scale, 10: 3335
- potentiometric analysis with oxalates and NaOH using glass electrode, 10: 2635(J)

## Thorium nitrides

- use in dry cells as a solid electrolyte, 10: 597(J)

## Thorium ores

- (See also Monazites.)
- geological configurations and prospecting in Italy, 10: 1787(J)
- spectrographic analysis for U and Th, 10: 1250(J)

## Thorium oxalates

- precipitation from nitric acid solutions, 10: 3485

## Thorium oxides

- a breeder material, properties, 10: 2701(J)
- magnesium reduction at 500°C, 10: 3345

## Thorium(IV) oxides

- entropy, enthalpy, and heat capacity from 10 to 300°K, 10: 2256(R)
- high-temperature properties and applications, 10: 1345(J)

## Thorium(IV) oxides (cont'd)

- hydrate, linkage of water in, and preparation, 10: 3263(J)
- physical properties, 10: 3603

## Thorium peroxide sulfates

- chemical analysis, 10: 3432

## Thorium powders

- preparation, 10: 1827(J)

## Thorium reserves (N.C.)

- occurrence in Cleveland and Lincoln Cos., 10: 804
- occurrence in Knob Creek Monazite Placer, 10: 1357

## Thorium-titanium alloys

- phase studies on, 10: 840

## Thorium-uranium alloys

- analysis for Th, 10: 3549
- thermal conductivity, 10: 3616

## Thorium-zirconium alloys

- phase studies, 10: 3196(R)

## Thoron

- (See Radon isotopes Rn<sup>220</sup>.)

## Thulium

- density and crystallographic data, 10: 570(R)
- metabolism and excretion rates of, in rats, 10: 1694

Thulium isotopes Tm<sup>169</sup>

- rotational states, 10: 1603(J)

Thulium isotopes Tm<sup>170</sup>

- applications in radiography, 10: 2599(J)

## Thymus

- oxygen consumption in, effects of total-body irradiation on, in rats, 10: 37(J)
- radioinduced morphological changes in rats, 10: 1990(J)

## Thyroid diseases

- radiotherapy of thyrotoxicosis and tracer studies using I<sup>131</sup>, 10: 1714(J)
- toxic adenomatous goiter, therapy with large doses of I<sup>131</sup>, 10: 1716(J)

## Thyroid gland

- carcinoma, treatment with I<sup>131</sup>, 10: 2601(J)
- effects of chronic exposure to I<sup>131</sup> in sheep, 10: 2577
- pathological effects of radiation from chronic doses of I<sup>131</sup> on, in sheep, 10: 1163

## Thyroxine

- labeled, endogenous, following I<sup>131</sup> therapy, 10: 1715(J)

## Tidwell Quadrangle (Utah)

- photogeologic map of, 10: 820(J), 1791(J), 1794(J), 1795(J), 1796(J), 1797(J)

## Tiffin Mine (Nev.)

- mineralogy, 10: 1358

## Time measurement

- of intervals down to 10<sup>-10</sup> sec, circuits for, 10: 237(J)
- of short intervals, continuously variable mercury delay line equipment for, 10: 238(J)

## Timing circuits

- design, for cyclotron application, 10: 3044
- development, for msec pulse measurement, 10: 3159
- diagram and operation of precision, 10: 1862(J)
- millimicrosecond, for large scintillation detectors, 10: 2121(J)

## Tin

- determination in Sn-Zr and Sn-U-Zr alloys, microtechnique, 10: 613
- diffusion in SbZn, 10: 869(J)

## Tin (cont'd)

- effects on mechanical properties of Ti and Ti alloys, 10: 1388
- elastic scattering of 80-kev neutrons by, comparison of experimental and theoretical data, 10: 428(J)
- elastic scattering of  $\gamma$  rays in, cross sections for, 10: 2916(J)
- electron and positron transmission in, 10: 1441(J)
- photoneutrons produced in, energy and angular distributions of, 10: 1899(J)

- solubility of, in SnCl<sub>2</sub>, 10: 62

## Tin-aluminum-zirconium alloys

- corrosion by water, 10: 858(R)

## Tin chlorides (liquid)

- solvent properties of, for Sn, 10: 62

## Tin crystals

- creep, effect of temperature on, 10: 846

## Tin ions

- hydrolysis of Sn<sup>4+</sup> in dilute H<sub>2</sub>SO<sub>4</sub> solutions, 10: 72(J)

## Tin isotopes

- decay, 10: 1111(J)

## Tin-molybdenum-zirconium alloys

- mechanical properties, effect of heat treatment on, preparation, 10: 833

## Tin-nitrogen-zirconium systems

- kinetics in temperature range of 920 to 1640°C, 10: 3195

## Tin-uranium-zirconium alloys

- analysis for Sn in, microtechnique, 10: 613

## Tin-zirconium alloys

- alloying behavior with Cu-base alloys at extrusion temperature, 10: 2436
- analysis, heat treatment, and crystal structure, 10: 1370(R)
- analysis for Sn in, microtechnique, 10: 613
- bend tests, equipment for, 10: 3360
- corrosion by Dowtherm A-alkylbenzene mixture, 10: 3005
- corrosion by water, effect of O and F on, 10: 858(R)
- corrosion in hot H<sub>2</sub>O, effects of Al impurities and microstructure on, 10: 859(R)
- corrosion in 600°F H<sub>2</sub>O, 10: 2703
- corrosion in H<sub>2</sub>O below 600°F, 10: 3611
- corrosion rates and dimensional stability at high temperatures, 10: 1810
- creep and tensile properties, 10: 3010
- development and production of heavy-walled back-extruded Zircaloy-2 cups, 10: 1822
- ductility, effect of H on, 10: 3015
- effect of fast neutrons on, 10: 2194
- electric and thermal conductivity, 10: 2437
- electroplating of Al, Cr, and Ni on, 10: 3358
- evaluation of hardness, composition, mechanical properties, and corrosion of modified Zircaloy 2, 10: 829
- fabrication, 10: 2441
- hydrogenation, and effects of radiation, 10: 2718
- phase studies and thermal analysis, 10: 3332
- physical and mechanical properties, 10: 3604
- production by consumable-electrode arc melting, 10: 3284
- thermal conductivity, 10: 3616
- recrystallization, deformation, and grain growth characteristics, 10: 1815
- tensile properties, 10: 1804

## Tin-zirconium alloys (cont'd)

thermal conductivity measurement over temperature range 50 to 400°C,  
10: 3366

## Tin-zirconium alloys (liquid)

reactions with H<sub>2</sub>O, 10: 560

## Tissue cultures

frozen ascites tumor bank, 10: 3327(R)

## Tissue homogenates

bone marrow-spleen, protective effects against radiation injuries in hamsters, 10: 1191(J)

effects on survival of x-irradiated rats, 10: 3167

preparation, 10: 1168(R)

of spleen, protective effects against  $\beta$ -induced skin injuries in rats,  
10: 2594(J)

## Tissues

(See also Connective tissue.)

beta dosimetry in, 10: 2838(J)

effects of penetrating radiation on, 10: 2582(J)

elastic fibers and sinews, fixation for microscopic examination,  
10: 1156(J)

gamma and x-ray absorption, 10: 2839(J)

human umbilical cords, analysis for Na hyaluronate, 10: 2993

ion exchange properties, 10: 4

penetration of, by high-speed liquid jets, 10: 2

preparation of samples for microscopic examination, 10: 2578

radiation damage to rat ovarian, at -79°C, 10: 2584(J)

radiation dosage determinations for, 10: 2602(J)

radiation dosage determinations from B<sup>10</sup>(n, $\alpha$ )Li<sup>7</sup> reaction, 10: 2968

spectrographic analysis for certain low-concentration elements,  
10: 3173(R)

water and electrolyte balance in various, following total-body irradiation  
in dogs, 10: 26(J)

## Titanium

chemical and spectrochemical analyses, 10: 607

corrosion in 500 and 600°F water, 10: 1806

determination of, in aqueous F<sup>-</sup> solutions with cupferron, 10: 620(J)

deuteron energy loss in, 10: 2173

development, present status of, 10: 2740(J)

diffusion of C, H, N, and O in, 10: 1389

ductility, effect of alloy composition, microstructure, and H on,  
10: 844(R)

ductility, effects of brittle skins on, 10: 2723

effects on properties of stainless steel, 10: 1401(J)

electric contact properties of, 10: 2731

electrodeposition from hydride-borohydride type baths, 10: 862(R)

electrodeposition of hard Ni and hard Cr plates on, 10: 193

fabrication, heat treatment, metallography, microstructure, handbooks  
on, 10: 1393

fabrication and use, status of, 10: 2741(J)

fabrication and welds, 10: 825(R)

future use of, pattern for, 10: 2742(J)

hydrogen removal by vacuum annealing, 10: 844(R)

lattice spacings of solid solutions, in  $\alpha$  iron, 10: 2087(J)

mechanical properties, effect of grain size on, 10: 1394(R)

mechanical properties, effect of H on, 10: 2080(R), 2729

mechanical properties, effects of Al, C, N, O, and Sn on, 10: 1388

metallographic identification of titanium hydrides in, 10: 627

neutron-capture  $\gamma$ -ray spectrum, 10: 2174(J)

## Titanium (cont'd)

physical and metallurgical properties, 10: 2434

plastic deformation, effects of temperature and strain rate, 10: 848

polarographic determination in Ti-Pu alloys, 10: 2302

preparation, metallurgy, and chemical properties, 10: 179(R)

production, processing plant for, 10: 175

production by electrolysis of potassium fluotitanate - sodium chloride  
systems, 10: 2766(R)

production from smelting of Idaho ilmenites, 10: 1808

research programs, 10: 1374, 1375, 1376, 1377, 1378

solvent extraction from leach solutions, 10: 700(R)

solvent extraction of, from carnotite leach solutions, 10: 710(R)

sorption of gas by, 10: 1825(J)

specifications, suggested standard for producers, 10: 1819

spectrophotometric determination, 10: 570(R)

strain-stress properties, microstructure, 10: 1398

vacuum degassing, 10: 1833(J)

## Titanium alloys

aging characteristics, stability, phase studies, and ductility, 10: 861(R)

beta transformation, 10: 2728

chemical and spectrochemical analyses, 10: 607

compressibility index for comparison with other metals, 10: 1820

crystal structure and constitution diagrams of binary and ternary systems,  
10: 190

delayed cracking in, 10: 856

diffusion of C, H, N, and O in, 10: 1389

drilling, 10: 187

ductility, effect of alloy composition, microstructure, and H on,  
10: 844(R)

electrodeposition of hard Ni and hard Cr plates on, 10: 193

engineering properties of commercial, 10: 189

fabrication of wire, 10: 1379

fusion welding and cold and hot forming, 10: 1366(R)

grain growth and microstructure at hot-worked temperatures,  
10: 2734

heat treatment, mechanical properties, microstructure, phase studies,  
and thermal decomposition, 10: 1387

heat treatment of alpha and beta phase stabilizers, 10: 1818

high-temperature properties and phase studies, 10: 1392(R)

machining, evaluation of K-boride cutting tools for, 10: 194

mechanical properties, effect of H on, 10: 2080(R), 2729

mechanical properties, effects of C, N, and O on, 10: 1388

mechanical properties, effects of hydrogen contamination on, 10: 2730

phase studies, 10: 2070

preparation, metallurgy, and chemical properties, 10: 179(R)

research programs, 10: 1374, 1375, 1376, 1377, 1378

scaling, 10: 823(R)

strain-stress properties, microstructure, 10: 1398

thermal expansion, 10: 2735

ultraviolet microscopic investigation, 10: 1408(J)

## Titanium-aluminum alloys

electrodeposition from hydride-borohydride type baths, 10: 862(R)

preparation and properties, 10: 1391

## Titanium-aluminum-iron alloys

phase studies, 10: 172

## Titanium-aluminum-vanadium alloys

notch sensitivity of weld heat affected zones, microstructure, and  
transformation curves, 10: 1811



- Titanium borohydrides  
preparation, 10: 862(R)
- Titanium bromides  
electrolysis of alcoholic solutions, 10: 862(R)
- Titanium carbide-boron carbide-silicon carbide systems  
density and oxidation resistance, 10: 788
- Titanium carbide compacts  
elastic properties, 10: 3603
- Titanium carbide-vanadium carbide-zirconium carbide systems  
physical properties, 10: 788
- Titanium carbides  
fabrication and physical properties, effect of C, CrO<sub>2</sub>, and TaC, on, 10: 559(R)  
neutron transmission, 10: 3650(R)  
physical properties and microstructure of, effects of production variables on, 10: 784(R)
- Titanium chlorides  
chemical and spectrochemical analyses, 10: 807  
electrolysis of alcoholic solutions, 10: 862(R)  
entropy and heat of formation of, 10: 572(R)  
preparation, 10: 2014(J)  
production and purification, 10: 603(J)  
purification, flowsheets for, 10: 175
- Titanium-chromium alloys  
high-temperature properties and phase studies, 10: 1392(R)
- Titanium-chromium-molybdenum alloys  
preparation, mechanical properties, heat treatment, and microstructure, 10: 1394(R)
- Titanium crystals  
rolling texture and recrystallization, 10: 882(J)
- Titanium-deuterium systems  
magnetic susceptibility, 10: 3035(R)
- Titanium-hafnium alloys  
corrosion, effect of N on, 10: 858(R)  
corrosion in hot H<sub>2</sub>O, 10: 859(R)
- Titanium hydrides  
metallographic identification and crystal symmetry, 10: 627
- Titanium-hydrogen systems  
constitution diagrams, 10: 2729  
crystal structure determination by neutron and x-ray-diffraction analysis, 10: 3020
- Titanium-iron-vanadium alloys  
phase studies, 10: 172
- Titanium isotopes  
electromagnetic separation, 10: 3026(R)
- Titanium isotopes Ti<sup>61</sup>  
decay scheme, 10: 1837(R)  
gamma emission, evidence of a 0.61-Mev transition, 10: 1837(R)
- Titanium-manganese alloys  
aging characteristics and effects of stress on, 10: 857  
fracture and tensile properties, effect of H embrittlement on, 10: 856  
plastic deformation and tensile properties, 10: 1396
- Titanium-molybdenum alloys  
transformation kinetics, effect of O<sub>2</sub> content on, 10: 867
- Titanium-nickel-zirconium alloys  
preparation and properties, 10: 1391
- Titanium nitrides  
preparation, 10: 2250(R)  
spectrographic analysis and corrosive effects on metals, 10: 2251(R)
- Titanium-nitrogen systems  
plastic deformation and tensile properties, 10: 1396
- Titanium oxide crystals  
thermal conductivity measurement, 10: 1342(R)
- Titanium oxide-lanthanum oxide systems  
preparation and crystal structure of a Perovskite-type phase, 10: 1753(J)
- Titanium oxides  
chlorination for production of TiCl<sub>4</sub>, 10: 603(J)  
synthesis of sphere type combination of, 10: 1311(J)
- Titanium(IV) oxides  
hydrate, linkage of water in, 10: 3263(J)
- Titanium-plutonium alloys  
analysis for Ti, 10: 2302
- Titanium silicides  
preparation, physical properties, and analysis, 10: 2738(J)
- Titanium-silicon systems  
high-temperature properties and phase studies, 10: 1392(R)
- Titanium systems  
crystal structure and constitution diagrams of binary and ternary systems, 10: 190
- Titanium-thorium alloys  
phase studies, 10: 840
- Titanium-uranium alloys  
spectrophotometric analysis for uranium, 10: 1233
- Titanium-uranium-zirconium alloys  
spectrophotometric analysis for uranium, 10: 1233
- Titanium-zirconium alloys  
analysis, heat treatment, and crystal structure, 10: 1370(R)  
corrosion-erosion of, 10: 1347  
corrosion in hot H<sub>2</sub>O, effect of microstructure on, 10: 859(R)
- Titration equipment  
micro, description and construction, 10: 2651(J)  
performance of Beckman automatic titrator for U analysis, 10: 3350
- Toluene  
chlorination, effect of  $\gamma$  radiation, 10: 2025  
scintillation properties of organic compounds in, 10: 1477(J)
- Tools  
(See Cutting tools.)
- Toroweap Formation (Nev.)  
geology, 10: 1358
- Toxins  
spectrographic analysis, design and operation of furnace for, 10: 486(J)
- Tracer techniques  
(See also Radioisotopes; Stable isotopes.)  
in hospitals, protection measures, 10: 1712(J)  
review, 10: 1835(J)  
in a university, protection measures, 10: 1710(J)
- Tracer techniques (agriculture)  
for fertilizer, and development of smut and rust-resistant plants, 10: 3169
- Tracer techniques (biology)  
in thyroid diseases, 10: 1714(J)

- Tradescantia**  
desoxypentose nucleic acid synthesis during microsporogenesis, 10: 2607(J)
- Transducers**  
design for a stabilized d-c power unit, 10: 921
- Transformation temperatures**  
(See also Phase studies.)  
uranium recrystallization after passing, 10: 1646(J)
- Transformers**  
epoxy resin casting of, 10: 787  
temperature and radiation effects on, 10: 781
- Transfusions**  
(See Blood transfusions.)
- Transistors**  
monitor for radioactive ore using, 10: 1465  
performance of Ge, 10: 1411(R)
- Transuranic elements**  
(See also specific elements, e.g. Plutonium.)  
radiochemical analysis, 10: 2626
- Traps**  
(See also Vacuum systems.)  
high-conductance baffle cold, with reservoir, 10: 144(J)
- Tributyl phosphate**  
(See Butyl phosphates.)
- Trichinosis**  
pathology, immunity, and effects of radiation, 10: 1981(J)
- Trifluoromethyl cyanide**  
(See Acetonitrile, trifluoro-.)
- Trinidad formation (Colo.)**  
exploration, 10: 1352
- Tritium**  
assay of, methane proportional counter for, 10: 973(J)  
beta particles, liquid scintillation counting using coincidence technique, 10: 3104  
bibliography, 10: 2976  
determination in presence of  $C^{13}$  and  $C^{14}$ , techniques and apparatus for gaseous sample preparation and counting, 10: 969(J)  
determination using butane, 10: 1875(J)  
deuteron reaction (d,n), deuteron energy loss and neutron production in, 10: 2173  
deuteron reactions (d,n), and cross sections between 1 and 5 Mev, 10: 3144(R)  
half-life measurement, 10: 452(J)  
isotope effects in enolization of ketones, 10: 1903(R)  
metabolism in rats, 10: 3409(R)  
metabolism of, by laboratory animals and plants, 10: 513(R)  
production by deuteron bombardment of Be, 10: 1578(J)  
proton reactions (p,n), counter ratio study, 10: 398(J)  
proton reactions (p,n) at 1 to 7 Mev, 10: 3152(J)  
radiometric determination in urine and water, 10: 3175  
radiometric determination of, in samples of blood, urine, or feces, 10: 606  
in water, counting at high humidities in the Geiger region, 10: 2823(J), 2824(J)  
-tium compounds  
bibliography, 10: 2976  
infrared spectra of  $T_2O$ ,  $HTO$ , and  $DTO$ , 10: 3026(R)
- Tritons**  
binding energy, three body contributions, 10: 2234(J)
- Trochotrons**  
(See also Mass spectrometers.)  
design of 9-cm, for mass analysis, 10: 2477
- Trudeau Foundation, Seranac Lake, N. Y.**  
progress reports on Be toxicity, 10: 2969(R)
- TTA**  
(See Acetone, thenoyltrifluoro-.)
- Tuballoy**  
(See Uranium.)
- Tubes**  
fabrication of stainless steel-carbon steel, 10: 2717  
friction factor determinations for air flow through hexagonal bundles, 10: 3004  
heat transfer and thermal stresses in thin walled cylindrical, and applications to Materials Testing Accelerator targets, 10: 3734  
pressure gradients due to temperature gradients in, 10: 2693
- Turbulent flow**  
(See Fluid flow (tubulent); Gas flow (turbulent).)
- Tufts Coll., Medford, Mass.**  
progress reports on high-temperature and high pressure x-ray studies, 10: 3276(R)  
progress reports on metal hydrogen systems, 10: 1641(R)  
progress reports on preparation and properties of metal-hydrogen systems, 10: 1728(R)
- Tumors**  
(See also Bone tumors; Brain tumors; Carcinomas.)  
effects of ascites, on response to toxic effects of La in mice, tracer study, 10: 552(J)  
Ehrlich mouse ascitic, radiosensitivity, effects of O concentration, 10: 2585(J)  
growth, effects of  $P^{32}$  and cortisone in mice, 10: 2600(J)  
growth, effects of radiation on, in mice, 10: 2588(J)  
histology, 10: 3327(R)  
induced by  $Ra^{226}$  injections in dogs, 10: 1160(R)  
radioinduced, following x irradiation, 10: 2589(J)  
radioinduced in rats, 10: 1(R)  
radioinduced in rats protected against radiation injury by parabiosis or para-aminopropiophenone, 10: 1165  
radiotherapy, dosage determinations from  $B^{10}(n,\alpha)Li^7$  reaction, 10: 2968  
radiotherapy by direct injection of radioactive material, 10: 2451  
serologic reactions associated with, 10: 1168(R)  
skin, induced by exposure to ultraviolet radiation in white populations, 10: 1161(R)  
therapy with radioisotopes, 10: 2603(J)  
of thyroid gland, treatment with  $I^{131}$ , 10: 2601(J)
- Tungstate ions**  
isotopic exchange of oxygen between heavy oxygen water and, 10: 1226(J)
- Tungsten**  
adsorption of Pu, 10: 3499  
chemical determination in B, 10: 3421
- Tungsten**  
fission cross sections for 460, 660-Mev protons, 10: 1071(J)  
meson ( $\pi$ ) capture by, fission and star formation from, 10: 275(J)  
neutron capture  $\gamma$ -ray spectrum and neutron total cross sections, 10: 3656  
neutron resonances, 10: 2141(J)

## Tungsten (cont'd)

radiation effects, dependence on incident proton energy, 10: 1944(R)

x-ray excitation of, 10: 331(R)

## Tungsten crystals

gas molecule effects on surface of, in electron microscope projector, 10: 2017(J)

## Tungsten cyanide complexes

exchange of  $(\text{CN})^-$  with, in aqueous solutions, 10: 73(J)

exchange of W between  $\text{W}(\text{CN})_6^{3-}$  and  $\text{W}(\text{CN})_6^{4-}$ , 10: 74(J)

## Tungsten fluorides

preparation and solubility of  $\text{UO}_3$ ,  $\text{UF}_4$ ,  $\text{UO}_2$ ,  $\text{UO}_2\text{F}_2$ , and  $\text{NaF}$  in, 10: 1817

## Tungsten carbides

neutron transmission, 10: 3650(R)

## Tungsten ions

exchange of, between  $\text{W}(\text{CN})_6^{3-}$  and  $\text{W}(\text{CN})_6^{4-}$ , 10: 74(J)

## Tungsten isotopes

relative abundance, 10: 2494(R)

Tungsten isotopes  $\text{W}^{186}$ 

formation of, from  $\text{Re}^{186}$  by  $\beta$  decay, 10: 1103(J)

## Tungsten-zirconium alloys

tensile properties, 10: 1804

## Turbine blades

coating and fabrication of Mo, 10: 865

## Turbines

gas closed cycle, for nuclear power plants, design, 10: 1150

## 25 Process

gas disposal, 10: 3324

gas disposal, survey of possible methods, 10: 3486

## U

## Ultraviolet radiation

effects of exposure to, on bacteriophages, 10: 516(R)

induction of skin tumors in white populations by, 10: 1161(R)

from synchrotron, spectral and angular distribution, 10: 1117

and x-radiation effects on albumin solutions, 10: 534(J)

## Ultraviolet spectra

of albumin, alteration by radiation, 10: 525(J)

## Ultraviolet spectroscopy

extreme, of solids, 10: 1116

purification of organic solvents for, 10: 3245(J)

## United States

reconnaissance for U in, 10: 2067(R)

## University of Southern Calif., Los Angeles.

progress reports on boron hydrides, 10: 1214(R)

## Uranic acid

preparation, 10: 3560

## Uranium

absorption and emission spectra, 10: 486(J)

activation determination, 10: 3341

adsorption by ion exchange resins, effects of Mo on, 10: 2983

adsorption from 1M  $\text{HClO}_4$  on Dowex-50 resins at 25°C, 10: 1764(J)

adsorption from ore pulps and solutions by a char-in-pulp adsorption separation process, 10: 1321

## Uranium (cont'd)

alpha particles from, energy distribution of, 10: 2498

analysis, methods of, 10: 150

analysis for Al, 10: 1737

analysis for  $\text{H}_2$ , 10: 2377

analytical data, 10: 3419(R)

beta- $\alpha$  transformation of, in stabilized Cr-U Alloys, 10: 1648(J)

beta surface dose from, extrapolation chamber for measurement, 10: 2480

book on, 10: 112(J)

by-product recovery, solvent extraction, 10: 1289(R)

capture-to-fission ratios, 10: 3752

casting, equipment and techniques, 10: 822

casting, insulation-radiation shielding for use during, 10: 3741

casting and heat treatment, 10: 2568

casting and melting, 10: 3751(R)

casting methods, 10: 3761

chromatographic determination using radioactive reagents, 10: 3351

colorimetric determination, 10: 3459

colorimetric determination, application to carnotite ores, phosphate rocks, Bartow clay, and organic and aqueous extracts, 10: 3334

colorimetric determination in aqueous solutions with 8-hydroxyquinoline, 10: 3567

colorimetric determination in ether extract by ascorbic acid, 10: 3532

colorimetric determination in "gyp" cakes, 10: 3521

colorimetric determination in plant solutions, 10: 3535

colorimetric determination in Ra cake, 10: 3455

colorimetric determination in Th, Bi, and ores, 10: 81(R)

colorimetric determination of  $\text{UO}_2^{2+}$  with 8-hydroxyquinoline, 10: 2275

colorimetric estimation in low grade ores, 10: 111(J)

compressibility, 10: 2568

corrosion by Li, 10: 2428

corrosion in air at low temperatures, 10: 2389

corrosion in  $\text{H}_2\text{O}$  at 100°C, 10: 2387

coulometric titration of  $\text{UO}_2^{2+}$  with  $\text{Ti}^{3+}$  in citrate solution, 10: 1247(J)

criticality studies of untamped conical vessels containing U solutions, 10: 3753

criticality studies on vessels containing U solutions, 10: 3754

crystal structure, 10: 3196(R)

crystal structure, effect of heat treatment on, 10: 1643(J)

crystal structure, x-ray-diffraction analysis, 10: 1644(J)

crystal structure of rolled and extruded alpha, 10: 1639

crystalline texture of rolled, studied by x rays, 10: 1647(J)

deformation and recrystallization textures in 300° rolled sheet, 10: 878(J)

deformation in  $\alpha$  crystals, mechanisms, 10: 1637

deformation mechanisms of  $\alpha$ -single crystals, 10: 1147(J)

determination in ground waters and soils in the U.S., 10: 2248(R)

determination in Mallinckrodt A-3 column, 10: 3458

determination in Mallinckrodt Ba cake, 10: 3449

determination in Mallinckrodt Chemical 6 raffinate cake, 10: 3451

determination in ores, comparison of NBS and Mallinckrodt procedures for, 10: 3445

determination in ores, manual of analytical methods for, 10: 1747(J)

determination in pitchblende by NBS procedure, 10: 3457

determination in pitchblende ores, 10: 3448, 3450

determination in sewage, 10: 3452



## Uranium (cont'd)

determination of, and Th concentration ratios in Indian rocks and minerals, 10: 1744(J)

determination of trace amounts of Th<sup>230</sup>, V, and Pa in, 10: 81(R)

diffusion into Al in temperature range 200 to 390°C, 10: 2091

diffusion into Zr, 10: 2679

diffusion length of neutrons in cylinder of, 10: 3760

diffusion of fission products, 10: 2548

dimensional stability, effect of thermal cycling on, 10: 2965

dimensional stability, effect of thermal cycling on, equipment for, 10: 777

dimensional stability under irradiation, 10: 2511

distribution between Mg-MgX<sub>2</sub> systems, 10: 3502

distribution between salt and metal phases, 10: 2518(R)

electrochemical properties, 10: 3500, 3501, 3502

electrode potentials of the U<sup>4+</sup>-UO<sub>2</sub><sup>2+</sup> (1M H<sub>2</sub>SO<sub>4</sub>) and U<sup>3+</sup>-U<sup>4+</sup> (1N HCl) couples, 10: 744

electrodeposition from acid solutions, 10: 3275

electrodeposition of enriched, in urine, 10: 3175

electrolytic precipitation from ion exchange eluates, 10: 2015

electrolytic precipitation from uranium leach solutions, 10: 2038

electrolytic separation and precipitation from carbonate leach solutions, 10: 2985

electrolytic separation from carbonate leach solutions, 10: 2659

electrolytic separation from carbonate leach solutions by ion exchange, 10: 2664

electrolytic separation from ion-exchange resin eluates, 10: 2688

electrolytic separation from leach liquor, 10: 2992(R), 3115

electromigration from acid leach liquor by ion exchange membranes, 10: 2036

electroplating with Ni, 10: 2387

electroprecipitation and ion exchange, 10: 723(R), 724(R)

energy band structure calculations, 10: 3405(R)

exchange between U<sup>4+</sup> and UO<sub>2</sub><sup>2+</sup>, 10: 3576

exchange between U<sup>3+</sup> and UO<sub>2</sub><sup>2+</sup>, 10: 3571

exchange between U<sup>3+</sup> and UO<sub>2</sub><sup>2+</sup>, 10: 3571

extraction from Grants ores by leaching and precipitation, 10: 661(R)

extraction from ores, 10: 670(R)

extraction of Pu and fission products from reactor-irradiated, 10: 2666(J)

extraction of U<sup>6+</sup> with 8-quinolinol, 10: 733(J)

fission, yields of Ba<sup>140</sup> and Cs<sup>137</sup>, 10: 500

fission and chain reactions, Russian review of, in 1940, 10: 3247(J)

fission cross sections for 460, 660-Mev protons, 10: 1071(J)

fission into four heavy fragments, 10: 1149(J)

fission product separation from, 10: 1654(P)

fission product yields of deuteron-bombarded, 10: 2239(J)

fluorimetric analysis, by fluorescence photometer, 10: 1837(R)

fluorimetric analysis for Zr, 10: 3349

fluorimetric determination, 10: 608, 3460, 3541

fluorimetric determination in leaf ash and soil, 10: 3422

fluorimetric determination in oil shales, 10: 3600

fluorimetric determination in sewage, 10: 3580

fluorophotometric determination in urine, 10: 3175

gamma-absorption determination in aqueous solutions, 10: 3105

grain size chart for, 10: 3407

## Uranium (cont'd)

gravimetric determination in UF<sub>4</sub>, 10: 3538

gravimetric determination in UF<sub>4</sub> samples, 10: 3512

hardness, effect of heat treatment on, density, 10: 3610

high-temperature heat content data for, 10: 2448

ion exchange, 10: 2980

ion exchange, effect of sulfate accumulation on elution, 10: 3119

ion exchange, equipment, 10: 2326

ion exchange, resins used in Western Reefs pilot plant for, 10: 2677

ion exchange and colorimetric determination, effects of interfering ions on, 10: 3343

ion exchange and precipitation, 10: 587

ion exchange and solvent extraction, 10: 1287

ion exchange for recovery of, from Cal-uranium ores, 10: 66

ion exchange from acid leach liquors, 10: 2661

ion exchange from acid leach solutions, efficiency, 10: 3347

ion exchange from Arrowhead ore, 10: 1303

ion exchange from Cal-uranium ore, 10: 1302

ion exchange from Edgemont ore leach solutions in RIP Process, 10: 1323

ion exchange from U leach solutions, 10: 2660

ion exchange of, cyclic testing of anion exchange resins for, 10: 2665

ion exchange on IRA-400, 10: 2987

ion exchange recovery from acid leach solutions from ore stockpiled at Monticello, Utah, 10: 667

ion exchange recovery from Grants leach liquors, 10: 664

ion exchange recovery from leach solutions, 10: 1286

ion exchange resin efficiency, 10: 3114

ion exchange separation from cobalticyanide, 10: 2689

in Fe meteorites, 10: 992(J)

irradiated, effects on x-ray diffraction, 10: 1975

irradiated, electrolytic etching, 10: 3049

isotopic separation by alkoxide distillation at low pressure, 10: 3057(P)

leaching of, from U powders and UBr<sub>3</sub>, 10: 3124

lignite ore concentration in the Vosges, France, 10: 809(J)

liquid metal extraction of Pu and fission products from, 10: 569(R), 570(R)

magnetic rotary polarization, 10: 3051(J)

mass spectrometric analysis of highly impoverished, for U<sup>235</sup>, 10: 3531

mechanical behavior evaluated with creep tests applied to alpha, 10: 3050

melting of small pieces, 10: 1638

meson ( $\pi^-$ ) capture by, fission and star formation from, 10: 275(J)

metabolism of, in humans, 10: 42(R)

metallography for x-ray-diffraction analysis, 10: 3762

metallurgy, 10: 3609(R)

mining, hazards involved in, 10: 542(J)

neutron absorption, 10: 2565

neutron flux distribution in annulus of pile irradiated, 10: 3655

neutron flux distribution in spheres of, effect of neutron velocity distribution on, 10: 3748

neutron resonance absorption, effect of temperature on, 10: 3647

neutron resonance absorption in lumps and mixtures containing, 10: 3758

neutron resonance cross sections for, in mixtures, 10: 3736

## Uranium (cont'd)

neutron scattering cross sections, 10: 2589

nonaqueous solvent extraction from Western ores, 10: 675(R)

organic leaching to recover U and V, 10: 681(R)

oxidation, kinetics, effect of  $O_2$  pressure on, 10: 2390

oxidation of, in  $O_2$ , 10: 1324(J)

photofission, into four heavy fragments, 10: 2238(J)

photofission with emission of light long-range particles of, 10: 1073(J), 2901(J)

polarographic determination in low-grade ores and process solutions, 10: 1239

polarographic determination in process streams, interference of trace V and Mo on, 10: 81(R)

potentiometric determination, Beckman automatic titrator for, 10: 3350

potentiometric determination in acid leach solutions, 10: 2998

potentiometric determination of micro amounts, 10: 2383

potentiometric titrations of  $UO_2^{2+}$  in alkaline solutions, 10: 2371

potentiometric titrimetric determination of, using  $K_2Cr_2O_7$ , 10: 2270

powder metallurgy, 10: 1803

precipitation, from nitrate solutions by sodium hydroxide, 10: 3559

precipitation from carbonate leach solutions, 10: 725

precipitation of, from Florida leached zone material, 10: 712(R)

preparation, by reduction of U chloride, 10: 2355

preparation by filament-induced decomposition of  $UBr_4$ , 10: 2394

preparation by filament-induced decomposition of  $UI_4$ , 10: 2393

preparation by reduction of  $UF_6$  with Ca, 10: 3575

preparation of standard  $U_3O_8$  samples by ignition of U compounds in air at  $1000^\circ C$ , 10: 3001

production, 10: 699(R)

production, effect of process variables on, 10: 3761

production and solvent extraction from carnotites and Florida leached zone materials, 10: 700(R)

production by electrolysis of fused salts, 10: 2385

production by reduction of U chlorides with Na, 10: 2360

production by reduction of U oxides and halides, 10: 3000

production by reduction of  $UNaF_6$ , 10: 1318

production by Zn reduction of oxides, 10: 3296(J)

production from Florida leached zone material, 10: 696(R)

production from Monticello ores, 10: 742

production from Temple Mountain ores, 10: 662

production of, solvent extraction and other methods of separation, 10: 693(R)

proton fission at 660 Mev, angular distribution of fragments from, 10: 499(J)

proton fission cross sections at 460 Mev, 10: 1070(J)

pyrohydrolytic determination in  $UO_2F_2$  and  $UF_4$ , 10: 615

quantitative determination of, in liquids, by x-ray-absorption techniques, 10: 616

radiation effects, 10: 3738, 3759

radioactivity, study of long  $\alpha$ 's from, 10: 3658

radiochemical analysis, 10: 2626

radiometric analysis, electrolytic polishing of Ni disks for, 10: 2682

radiometric determination in Arco Chemical Plant process solutions, 10: 1316

radiometric determination in low-grade ores, 10: 2392

radiometric determination of, in closed containers, 10: 3557

## Uranium (cont'd)

radiometric determination of trace amounts in mud, 10: 3123

reactivity after irradiation, 10: 3313(R)

recovery, after fuel slug rupture in autoclaves, 10: 2512(R)

recovery, from acid solutions, 10: 2043(R)

recovery, operation of Resin-In-Pulp Process pilot plant for, 10: 3344

recovery by ion exchange, 10: 107(R), 2991(R)

recovery by ion exchange and solvent extraction from  $H_3PO_4$ , 10: 676(R)

recovery by ion exchange from sulfate solutions, 10: 722(R)

recovery by ion-exchange methods, 10: 703(R)

recovery by solvent extraction from industrial phosphoric acids, 10: 3112

recovery from acid leach solutions by ion exchange, 10: 2037, 3342

recovery from by-product solution, 10: 3423

recovery from C, 10: 2366

recovery from C by solvent extraction, 10: 3629, 3630

recovery from carbonate leach solutions by hydrogen reduction, 10: 727

recovery from carnotite ores, 10: 689(R)

recovery from carnotite ores and leach zone material, 10: 695(R)

recovery from carnotites, 10: 669(R)

recovery from Chattanooga shale, process for, 10: 2999(R)

recovery from Chattanooga shales, 10: 1300(R)

recovery from electrode ash by alkaline fusion, 10: 2374

recovery from gyp cakes by  $Na_2CO_3$  extraction, 10: 3522

recovery from Hanford waste, 10: 3579

recovery from  $HF - H_2SO_4$  solutions of Hanford waste, corrosion problems, 10: 3597

recovery from  $H_3PO_4$ , 10: 685(R)

recovery from  $H_3PO_4$  solutions, 10: 702(R)

recovery from industrial phosphoric acid by liquid-liquid extraction or precipitation, 10: 678(R)

recovery from Lukachukai ore by organic phosphates, 10: 679(R)

recovery from machine wash by solvent extraction with ether, 10: 3572

recovery from machine wash solutions, 10: 2372

recovery from natural waters, 10: 3550

recovery from ore by ion exchange, 10: 67

recovery from ores and phosphoric acid by acid leaching or solvent extraction, 10: 687(R)

recovery from ores by electrolytic process, 10: 2658

recovery from phosphoric acid and Lukachukai ore by solvent extraction and ion exchange, 10: 684(R)

recovery from phosphoric acid and ores by solvent extraction or adsorption, 10: 681(R)

recovery from phosphoric acid by ion exchange, 10: 682(R)

recovery from phosphoric acid by precipitation and solvent extraction, 10: 680(R)

recovery from phosphoric acid by solvent extraction and ion exchange, 10: 677(R)

recovery from phosphoric acid waste by solvent extraction, 10: 586(R)

recovery from saline solutions by biological slimes, 10: 3341

recovery from salvage solutions by ether extraction, 10: 3532

recovery from U bearing minerals, 10: 663(R)

recovery from  $UF_6$  reduction bomb wastes, 10: 3120

recovery from Vitro leach solutions by ion exchange, 10: 3117

recovery of, by solvent extraction and ion exchange, 10: 683(R)

recovery of, during manufacture of phosphoric acid, 10: 698(R)

## Uranium (cont'd)

recrystallization after passing through transformation points, 10: 1646(J)

recrystallized texture of deformed  $\alpha$ , and preferred orientation, 10: 743

rolling and recrystallization textures in 600 and 300°C rolled, 10: 1636

sampling for, in Mallinkrodt process, 10: 719

separation from acid leach solutions, 10: 666

separation from Bi, 10: 2440(R)

separation from ion-exchange eluates by electrolytic precipitation, 10: 1767

separation from Fe-U, 10: 3495

separation from ores by carbonate leaching, review, 10: 3118

separation from ores by ion exchange, 10: 3277

separation from ores by organic leaching, 10: 717

separation from organic leach solutions by solvent extraction, 10: 717

separation from plateau ores by solvent extraction and organic leaching, 10: 2044(R)

separation from Pu and fission products by ion exchange, 10: 1319

separation from Pu by Sn alloy formation, 10: 3553

separation from Pu by vacuum distillation, 10: 2074

separation from reactor fuels by electrowinning, 10: 2683

separation from sulfuric acid leaches by solvent extraction with alkyl phosphate esters, 10: 3122

separation from U leach solutions (carbonate) by electrolytic precipitation, 10: 2686

separation of Pu from neutron-irradiated, 10: 1762(J)

separation of Pu from neutron-irradiated, survey, 10: 1761(J)

shielding properties for  $\gamma$  rays and neutrons, 10: 3756

solubility in molten Bi at 500°C, magnesium effects on, 10: 3345

solubility of He in, 10: 3415

solutions, determination of phosphates, 10: 2290

solvent extraction, factors influencing use of TBP for, 10: 3181

solvent extraction from acid leach solutions with organic solvents, 10: 3563

solvent extraction from carnotites, 10: 704(R), 705(R), 706(R), 707(R)

solvent extraction from carnotites, shales, leach zone material, and fluorite ore, 10: 697(R)

solvent extraction from carnotites with TBP, 10: 694(R)

solvent extraction from Florida leached zone material, 10: 3113

solvent extraction from heavy slurries, 10: 3180(R)

solvent extraction from  $\text{HClO}_4$  with TTA in benzene, 10: 3566

solvent extraction from  $\text{HNO}_3$  solutions with TTA in organic solvents, 10: 2333

solvent extraction from leach solutions, 10: 674(R), 691(R)

solvent extraction from leach solutions and phosphoric acid, 10: 701(R)

solvent extraction from liquids of leached zone materials, 10: 1294

solvent extraction from ores with organophosphates, 10: 2678

solvent extraction from phosphate rocks with OPPA, 10: 2045

solvent extraction from sulfate leach solutions, 10: 728

solvent extraction of, 10: 686(R)

solvent extraction of, from carnotite leach solutions, 10: 708(R), 709(R)

solvent extraction of, from carnotite leach solutions, Florida leached zone material, and phosphate slurries, 10: 710(R)

solvent extraction of, from Florida leached zone material, 10: 711(R), 745(R)

solvent extraction of, from Florida leached zone material and slurries of Lukachukai ore, 10: 692(R)

## Uranium (cont'd)

solvent extraction of, from leach solutions of Florida leached zone material, 10: 690(R)

solvent extraction of, from plateau and Utex ores, 10: 712(R), 713(R)

solvent extraction of, from plateau ore leach solutions, 10: 715(R), 716(R)

solvent extraction of, from plateau ores, 10: 714(R)

solvent extraction with amines, 10: 3186(R)

solvent extraction with ethyl ether from nitrate solution, 10: 2324

solvent extraction with TBP, 10: 3496

solvent extraction with TBP in  $\text{CCl}_4$  solutions, 10: 2376

specific heat, enthalpy, and entropy, from 0° to 900°C, 10: 2566

spectrographic analysis for rare-earth, refractory, and Pt-group metals, 10: 604

spectrographic determination in octyl phosphoric and pyrophosphoric acids, 10: 682(R)

spectrographic determination in ores, 10: 1250(J)

spectrometric determination in organic and aqueous solutions, 10: 1249(J)

spectrophotometric, fluorimetric, and potentiometric determinations in HCP Process solutions, 10: 3533

spectrophotometric analysis for  $\text{U}^{4+}$  and  $\text{U}^{6+}$  ions in aqueous solutions, 10: 3530

spectrophotometric determination in aqueous solutions containing Fe, Al, Mg, and  $\text{SO}_4^{2-}$ , 10: 2691(J)

spectrophotometric determination in phosphate rocks and shales, 10: 2284

spectrophotometric determination in U metal and  $\text{U}_3\text{O}_8$ , 10: 605

spectrophotometric determination in various binary and ternary base, alloys, 10: 1233

static potential measurements, 10: 887

surface finishing by machining, 10: 851

temperature-electrical resistance relationships for  $\alpha$ -rolled, 10: 2236

tensile properties, effects of H and heat treatment on, 10: 1143

thermal conductivity, 10: 3616

thermal conductivity and physical constants, 10: 3680

thermal conductivity of powder compacts at 40 and 100°C, 10: 3161

thermal diffusivity measurements, 10: 3367(R)

thermal expansion, design of electrical detection system for, 10: 1673(P)

tissue distribution of injected, in man, 10: 43(R)

titrimetric determination in aqueous plant samples, 10: 3518

titrimetric determination in vanadium-containing plant-digestion liquors, 10: 2272(R)

uranium hydride inclusions in, metallographic study of, 10: 1645(J)

volumetric analysis, precision of, 10: 2276

volumetric determination, 10: 3515

volumetric determination, pre-solution purification by electrolysis, 10: 3346

volumetric determination by metallic Zn reduction-dichromate titration, 10: 2271

x-ray-spectrographic determination, 10: 3517

Uranium (Al clad)

electrochemical corrosion studies and potential measurements, 10: 887

Uranium (liquid)

reactions with  $\text{H}_2\text{O}$ , 10: 560

Uranium (Zr clad)

explosions in pickling and etching, 10: 3615

Uranium alcohols

distillation at low pressures, 10: 3057(P)



## Uranium alloys

- corrosion in air and  $H_2O$ , 10: 3598
- heat treatment and microstructure, 10: 2443
- liquid Ag extraction, 10: 569(R)
- phase studies, 10: 2070

## Uranium-aluminum alloys

- constitution diagrams, 10: 2441
- phase studies, 10: 837(R), 3761

## Uranium-aluminum couples

- corrosion current density measurements, 10: 887

## Uranium-aluminum-silicon system couples

- corrosion current density measurements, 10: 887

## Uranium-beryllium alloys (clad)

- production, 10: 2446

## Uranium-bismuth alloys

- microstructure and phase equilibria, 10: 3761
- phase studies, 10: 837(R)

## Uranium-bismuth alloys (liquid)

- corrosive effects on stainless steel and Croloy, with and without Mg and Zr additions, 10: 2440(R)
- corrosive effects on Ta loops, 10: 1774(R)

## Uranium bromides

- leaching of U from, 10: 3124
- reaction mechanisms of, with Na in biphenyl, amylsodium, Na benzophenone ketyl, and Na naphthalene glycol ether, 10: 3124

## Uranium(III) bromides

- crystal structure, 10: 1817

## Uranium(IV) bromides

- thermal decomposition, 10: 3000

## Uranium-carbon sandstone deposits (U.S.)

- geochemistry, 10: 2067(R)

## Uranium-carbon sandstone deposits (Utah)

- occurrence in Caribou Mountains, 10: 151
- occurrence in Temple Mountain District, 10: 1785(R)

## Uranium-carbon systems

- physical properties, 10: 3761

## Uranium chlorides

- magnesium reduction at 500°C, 10: 3345
- preparation by reactions of oxides with  $CCl_4$ , 10: 2360
- reduction for preparation of U, 10: 2360
- reduction with Ca in preparation of U metal, 10: 2355

## Uranium(III) chlorides

- crystal structure, 10: 1817
- enthalpy, entropy, and specific heat, 10: 2369

## Uranium(IV) chlorides

- analysis for uranium,  $Cl^-$ , Fe, and Cu, 10: 3533
- preparation, 10: 3527(R)
- preparation, physical and chemical properties, solubility, chemical reactions, vapor-phase reactions, etc., 10: 3529
- preparation and properties of molten and fused, 10: 3570
- preparation by chlorination of  $UO_3$  with  $CCl_4$  or thionyl chloride, 10: 3539
- preparation by reaction of  $CCl_4$  with U oxides, 10: 3054(P)
- preparation by reactions of hexachlorophene with uranium compounds, 10: 2373
- preparation by vapor phase chlorination of  $UO_2$ , 10: 2365
- preparation from  $UF_4$  and  $UF_6$ , 10: 3537

## Uranium(IV) chlorides (cont'd)

- production by chlorination of  $UO_3$ , 10: 3540
- production by reaction of uranium oxide, with hexachloropropene, analytical procedures, 10: 3533
- stick, preparation and properties, 10: 3627
- sublimation, theory of, 10: 1817
- ultraviolet spectra, 10: 3565
- volatile impurities in, determination, 10: 2367
- volatility properties, measurement, 10: 2368

## Uranium(VI) chlorides

- age decomposition and contamination, protection against, 10: 1656(P)
- preparation, 10: 3055(P)

## Uranium-chromium alloys

- beta- $\alpha$  transformation of U in stabilized, 10: 1648(J)
- constitution diagrams, isothermal transformation of  $\beta$ - to  $\alpha$ -uranium in, 10: 879(J)
- linear thermal expansion and thermal conductivity from 20 to 800°C, 10: 2716
- thermal conductivity, 10: 3616

## Uranium complexes

- ion exchange IRA-400, 10: 2987
- polarographic studies of  $U^{3+}$  complexes with cupferron, 10: 751(J)
- with salicylaldehyde and amino acids, preparation and properties, 10: 749(J)

## Uranium compounds

- analysis for rare earths, 10: 2978
- chemical properties, 10: 3416
- organic, preparation, 10: 3508(R), 3509
- organic, preparation of U dithiocarbamates, 10: 3167

## Uranium-copper alloys

- alloying theory, 10: 3361

## Uranium couples

(See Aluminum - uranium couples.)

## Uranium crystals

- deformation in  $\alpha$ -, mechanisms, 10: 1637
- expansion behavior, 10: 1649(J)
- preparation by change of phase method and x-ray-analysis of, 10: 753(J)

## Uranium deposits

- formation, role of  $CO_2$  in, 10: 821(J)
- geologic investigations for, 10: 2067(R)

## Uranium deposits (Australia)

- occurrence in South Australia, 10: 171(J)

## Uranium deposits (Nev.)

- occurrence in Goodsprings Mining District, interpretation and evaluation, 10: 1358

## Uranium deposits (N. Mex.)

- occurrence in Church Rock Area, 10: 2063

## Uranium deposits (Saskatchewan)

- age determination, mineralogy, 10: 808(J)

## Uranium deposits (Utah)

- occurrence in Happy Jack Mine, 10: 160(J)

## Uranium deuterides

- neutron-diffraction analysis and magnetic properties, 10: 320(R)

## Uranium ethoxides

- preparation of  $U(OEt)_2$  and  $U(OEt)_4$  by alcoholysis of  $UCl_4$ , 10: 3510

## Uranium fluorides

preparation and properties of  $U_2F_8$ , 10: 2370

## Uranium(IV) fluorides

analysis, 10: 3512

analysis for carbon, 10: 1739

analysis for Cu, by chemical and spectrographic means, 10: 3456

analysis for U, 10: 3538

assay, ceric sulfate method, 10: 2388

chlorination, for mixed salt preparation, 10: 1317

chlorination to  $UCl_4$ , 10: 3537

colorimetric analysis for Cu, 10: 3426

fluorination to  $UF_6$ , 10: 2386

preparation, 10: 3542

production by Mallinckrodt Process, analytical control, 10: 748

pyrohydrolytic analysis for F and U, 10: 615

reaction with  $SbF_5$ , 10: 3511

reduction, bomb fillers and liners for, 10: 3751(R)

vaporization, for separation of fission products and Pu from liquid U, 10: 3348

volumetric determination in impure  $UF_4$  samples, 10: 3512

x-ray-diffraction analysis, 10: 114(J)

## Uranium(V) fluorides

decomposition, 10: 2370

## Uranium(VI) fluorides

absorption in aqueous media, 10: 3525

critical dimensions of  $H_2O$ -tamped spheres and slabs, and neutron diffusion lengths in, 10: 3749

dehydration to anhydrous  $UF_4$ , 10: 2356

density of, near triple point, 10: 2357

distillation as a means of refining, 10: 2361

electrical resistivity and dielectric constant, 10: 3556

emissivity and heat transfer from, 10: 2380

expansion of, from triple point to 92°C., 10: 2357

preparation by fluorination of  $UF_4$  or  $UCl_3$ , 10: 3519

preparation for mass-spectrographic analysis, 10: 2386

preparation from organic extracts, 10: 3180(R)

reduction to  $UF_4$ , 10: 3537

reduction with Ca in preparation of metallic U, 10: 3575

ultraviolet absorption determination in gas streams, 10: 3747(R)

valves for handling, performance, 10: 2358

vapor pressure, measurement in temperature range 850 to 1000°C, 10: 2570

viscosity, 10: 2362

## Uranium-gold alloys

alloying theory, 10: 3361

## Uranium-graphite systems

thermal utilization and diffusion lengths in lattices of, 10: 1546

## Uranium halides

reduction to U metal, 10: 3000

## Uranium(IV) halides

preparation of mixed salts by  $UO_2F_2$  chlorination, 10: 1317

## Uranium hydrides

density and x-ray-diffraction pattern, 10: 3124

density of dehydrided, 10: 1320

dissociation pressure, 10: 1641

inclusions in U, metallographic study, 10: 1645(J)

neutron-diffraction analysis and magnetic properties, 10: 320(R)

## Uranium hydrides (cont'd)

preparation, phase studies, thermal expansion, and transformation, 10: 3276(R)

preparation, crystal structure, and chemical properties, 10: 1641

## Uranium iodides

magnetic and thermal properties at liquid He temperatures, 10: 1148(J)

## Uranium(IV) iodides

thermal decomposition, 10: 3000

## Uranium ions

exchange of U between  $U^{3+}$  and  $UO_2^{2+}$ , 10: 3571

## Uranium(III) ions

chemical properties, 10: 3453

determination in  $UO_2$  solutions, 10: 3453

## Uranium(IV) ions

coulometric titration of  $Ce^{4+}$  and  $Cr^{6+}$  with, 10: 752(J)

hydrolysis in  $HClO_4$  solutions, 10: 1769(J)

oxidation by  $Fe^{3+}$  in aqueous solution, 10: 1770(J)

spectrophotometric determination in aqueous solutions containing  $U^{4+}$  and  $U^{6+}$  ions, 10: 3530

## Uranium(VI) ions

determination, 10: 3454

extraction from aqueous solutions with 8-quinolinol, 10: 733(J)

spectrophotometric determination in aqueous solutions containing  $U^{4+}$  and  $U^{6+}$  ions, 10: 3530

## Uranium-iron alloys

uranium recovery, 10: 3495

## Uranium isotopes

determination with scintillation counters, 10: 3649(R)

photochemical separation of  $U^{235}$  and  $U^{238}$ , 10: 2471

relative abundance of, routine methods for determination, 10: 3162

spectrographic analysis, analytical analysis of results, 10: 3026(R)

Uranium isotopes  $U^{230}$ 

alpha-gamma emission, 10: 1729(R)

Uranium isotopes  $U^{232}$ 

gamma spectra, 10: 1640

Uranium isotopes  $U^{233}$ 

alpha reactions, spallation-excitation functions, 10: 1729(R)

alpha spectrum, measurement, 10: 336(J)

breeding, 10: 3313(R)

critical mass and reactivity temperature coefficient, 10: 1642

delayed neutron yields from fast and thermal fission, 10: 330

energy levels, 10: 3649(R)

estimated mass in MTR Th slugs, 10: 1144

fission neutron spectrum, 10: 320(R)

neutron fission and absorption cross sections, 10: 340(J)

neutron fission cross sections from 3.4 to 150 kev, 10: 3144(R)

photoneutron yield from fission products, in  $D_2O$ , 10: 2860(J)

production in ORNL Graphite Reactor, 10: 3402

prompt neutrons from fission, angular correlation measurements, 10: 1004(J)

spheres of, contaminated with  $U^{232}$ , gamma spectra, 10: 1640

Uranium isotopes  $U^{234}$ 

alpha spectrum, measurement, 10: 336(J)

neutron fission cross sections, 10: 320(R)

neutron fission cross sections, to 4.0 Mev, 10: 1650(J)

Uranium isotopes  $U^{235}$ 

- angular distribution of fission fragments, induced by neutrons of various energies, 10: 3238(J)
- capture-to-fission ratio, 10: 2495(R)
- consumption rate in Pu feedback systems, 10: 3313(R)
- critical mass and reactivity temperature coefficient, 10: 1842
- critical masses of, in  $H_2O$  moderated assemblies with  $H_2O$ ,  $D_2O$ , and Be reflectors, 10: 3230
- criticality studies of sphere surrounded by U shell, 10: 3757
- delayed neutron yields from fast and thermal fission, 10: 330
- determination in fission products, 10: 1230
- determination in U slugs, gamma scintillation spectrometer for, 10: 3002
- determination of, in irradiated samples by counting delayed neutrons, 10: 2142(R)
- fission, yields of Cs isotopes formed, 10: 1580(J)
- fission, yields of 28 mass chains in thermal neutron, 10: 1581(J)
- fission-counting determination, improvements in precision of, 10: 3763
- fission products, neutron absorption cross sections, 10: 1547
- fission products, search for  $Cl^{38}$ , Br, and I in, 10: 3650(R)
- fission products, short lived  $\gamma$  emitters in, 10: 3764
- gamma spectra from fission of, 10: 320(R)
- hyperfine structure, 10: 2470
- isotopic abundance, determination by neutron fission in, 10: 2796(J)
- mass spectrometric determination in impoverished U material, 10: 3531
- neutron absorption cross sections from 5 to 50 kev, 10: 3144(R)
- neutron attenuation in, in mixture with  $H_2O$ , 10: 2858
- neutron fission and absorption cross sections, 10: 340(J)
- neutron fission cross section measurement from 0.4 to 1.6 Mev, 10: 1145
- neutron fission cross section ratio  $\sigma_f(Pu^{239})/\sigma_f(U^{235})$ , 10: 2504
- neutron fission cross sections, calculation, 10: 3220
- neutron resonance absorption, 10: 3315(R)
- photoneutron yield from fission products, in  $D_2O$ , 10: 2860(J)
- photoneutron yield from fission products of, in Be, 10: 2859(J)
- prompt neutrons from fission, angular correlation measurements, 10: 1004(J)
- radiometric determination, 10: 2046, 3639
- recovery from calutron-collector carbons, 10: 3568
- separation from  $U^{238}$  by alkoxide distillation, 10: 3057(P)
- separation from  $U^{238}$  by flotation, 10: 3296(J)
- spallation and fission, 10: 3104

Uranium isotopes  $U^{236}$ 

- neutron fission cross sections, 10: 320(R)
- neutron fission cross sections, to 4.0 Mev, 10: 1650(J)

Uranium isotopes  $U^{237}$ 

- determination in fission products, 10: 1230
- methods of measuring  $\beta$  radiation when used as a tracer, 10: 3640

Uranium isotopes  $U^{238}$ 

- angular distribution of fission fragments induced by thermal neutrons, 10: 3238(J)
- delayed neutron yields from fast fission, 10: 330
- deuteron fission of, formation cross sections of products from, 10: 2237
- fission and spallation by 22- to 46-Mev alpha particles, 10: 3246
- fission product distribution curves for d, p, and He bombardment, and fission cross sections for d and p, 10: 2240(J)

Uranium isotopes  $U^{238}$  (cont'd)

- neutron reactions ( $n, 2n$ ), cross section for, 10: 2256(R)
- neutron resonance integrals, 10: 3854(R)
- photofission, angular distribution of fragments, 10: 2964
- separation from  $U^{235}$  by alkoxide distillation, 10: 3057(P)
- separation from  $U^{236}$  by flotation, 10: 3296(J)

Uranium isotopes  $U^{239}$ 

- thermal neutron fissionability, 10: 2567

## Uranium leach precipitates

- salt roasting for production of V, 10: 665
- uranium recovery from, by ion exchange, 10: 2660

## Uranium leach residues

- carbonate leaching, processing, 10: 2984
- salt roasting for production of V, 10: 665

## Uranium leach residues (acid)

- flotation, 10: 662
- thickening tests of, 10: 66

## Uranium leach residues (carbonate)

- filtration, 10: 66

## Uranium leach solutions

- acid and caustic, efficiency in solvent extraction of U, 10: 693(R)
- analysis for Ca, 10: 3446
- analysis for Th, 10: 3536
- electrolysis for recovery of Mn and  $H_2SO_4$ , 10: 2035
- ion exchange separation of U and cobaltcyanide, 10: 2689
- recovery of U and V from, by solvent extraction, 10: 714(R)
- recovery of uranium by ion exchange, 10: 3117
- recovery of V from U leach solutions by ion exchange, 10: 2986
- separation of U from, by ion exchange, 10: 723(R)
- solvent extraction, 10: 691(R)
- solvent extraction of, recovery of Al, Fe, Mo, U, and V, 10: 711(R)
- solvent extraction of U and V from, 10: 708(R), 710(R)
- solvent extraction of U from, 10: 674(R), 728
- uranium and vanadium recovery by solvent extraction, 10: 701(R)
- uranium and V recovery from, 10: 696(R)
- uranium and V recovery from, by solvent extraction, 10: 707(R), 712(R), 713(R), 715(R), 716(R)
- uranium recovery by ion-exchange, 10: 714(R)
- uranium recovery by solvent extraction, 10: 675(R)
- uranium recovery from, 10: 681(R)
- uranium recovery from acid and caustic, 10: 700(R)

## Uranium leach solutions (acid)

- aluminum, U, and V recovery from carnotite acid leach liquors, 10: 2337
- corrosive effects on stainless steels, 10: 3599
- electrolysis for recovery of U, 10: 2036, 2992(R)
- electrolysis for separation of U, 10: 2687
- electrolysis for U and V separation, 10: 3115
- filtration and U recovery, 10: 687(R)
- ion exchange, 10: 662, 2987
- ion exchange for recovery of U, 10: 66, 2661
- ion exchange for U and V recovery, 10: 2981
- ion exchange of Edgemont ore solutions, 10: 1323
- ion exchange recovery of U from Grants, 10: 664
- ion exchange removal of U from, 10: 660(R)



## Uranium leach solutions (acid) (cont'd)

- potentiometric analysis for U, V, and Fe, 10: 2998
- recovery of U and V from, by ion exchange, 10: 1286
- recovery of U from, 10: 745(R)
- recovery of U from, by ion exchange, 10: 683(R), 3342
- solvent extraction, 10: 699(R)
- solvent extraction methods for U and V recovery, 10: 695(R)
- solvent extraction of Al, U, and V from, 10: 694(R)
- solvent extraction of U, 10: 1294
- uranium adsorption effects of Mo on, and cyclic column testing, 10: 2983
- uranium and V recovery by solvent extraction, 10: 706(R)
- uranium and V recovery from, 10: 692(R)
- uranium recovery, 10: 587, 698(R)
- uranium recovery by ion exchange, 10: 2037, 2665, 3111
- uranium recovery by ion exchange, effect of sulfate accumulation on elution, 10: 3119
- uranium recovery by ion exchange and solvent extraction, 10: 2999(R)
- uranium recovery by solvent extraction, 10: 697(R), 740(R)
- uranium separation by solvent extraction with alkyl phosphate esters, 10: 3122

## Uranium leach solutions (carbonate)

- electrolysis for recovery of U and V, 10: 2038
- electrolysis for recovery of U, 10: 2659, 2985
- electrolysis for separation of U and V, 10: 2664, 2690
- extraction of U following precipitation of, 10: 680(R)
- ion exchange for U and V recovery, 10: 2981
- recovery of U and V from, by electrolysis, 10: 1298
- recovery of U by ion exchange, 10: 2980
- recovery of U from, by  $H_2$  reduction, 10: 727
- recovery of U from, by ion exchange, 10: 107(R)
- solvent extraction, 10: 699(R)
- uranium and V recovery from, by electrolysis, 10: 725
- uranium recovery, 10: 698(R)
- uranium recovery, review, 10: 3118
- uranium recovery by precipitation, 10: 661
- uranium recovery by solvent extraction, 10: 697(R)
- uranium separation by electrolytic precipitation, 10: 2686

## Uranium leach solutions (caustic)

- recovery of U from, 10: 745(R)
- uranium recovery from, by precipitation, 10: 692(R)

## Uranium leach solutions (organic)

- recovery of U from, 10: 686(R)
- solvent extraction, 10: 717, 2044(R)
- uranium and V recovery by solvent extraction, 10: 705(R)
- uranium extraction, 10: 1289(R)
- uranium recovery, 10: 689(R)

## Uranium-magnesium alloys

- diffusion, preparation, metallography, and phase studies in a complete study of, 10: 2719

## Uranium-manganese alloys

- analysis, 10: 2378

## Uranium minerals

(See also specific minerals, e.g., Carnotites.)

- crystallography, 10: 2066

## Uranium minerals (cont'd)

- flotation, U loss in acid circuit, 10: 2043(R)
- flotation of, from Lake Athabaska ore, 10: 663(R)
- genesis and occurrence in Col., S. Dak., N. Dak., and Wyo., 10: 3130(R)

## Uranium-molybdenum alloys

- analysis for Mo, 10: 3444
- casting and melting, 10: 2568
- electrical resistance, hardness, and microstructure, 10: 1368
- hardness, effect of heat treatment on, casting and density, 10: 3610
- heat treatment, 10: 3601
- phase diagram, microstructure, and strength of heat-treated, 10: 2444
- spectrophotometric analysis for uranium, 10: 1233
- thermal conductivity, 10: 3616
- transformation kinetics, 10: 1368
- ultrasonic inspection of cast and wrought, 10: 2084

## Uranium-molybdenum alloys (liquid)

- reactions with  $H_2O$ , 10: 560

## Uranium-molybdenum-niobium alloys

- spectrophotometric analysis for uranium, 10: 1233

## Uranium-nickel alloys

- static potential measurements, 10: 887

## Uranium-nickel-uranium alloy couples

- corrosion current density measurements, 10: 887

## Uranium-niobium alloys

- phase studies, 10: 3196(R)

## Uranium-niobium-zirconium alloys

- explosions in pickling and etching, 10: 3615

## Uranium ore processing plants

- for electrolytic recovery of U, 10: 2985
- hydrochloric acid recovery from, 10: 2662
- operation, 10: 3344
- for recovery of U from Florida leached zone material, 10: 3113
- for resin-in-pulp process for U recovery, 10: 2660
- small-scale pilot plants, development, 10: 117

## Uranium ores

- acid and carbonate leaching, 10: 66
- acid and carbonate leaching, amenability tests, 10: 587
- acid and carbonate leaching of North Jackpile ores and amenability tests, 10: 1322
- acid and carbonate leaching of Temple Mountain District, 10: 2981
- acid and organic leaching, 10: 685(R)
- acid leaching, amenability tests, 10: 666
- acid leaching, amenability tests, and V recovery, 10: 667
- acid leaching, amenability tests, chlorination, organic leaching, 10: 673(R)
- acid leaching and U recovery, 10: 3180(R)
- acid leaching of Edgemont ores, 10: 1323
- amenability tests and vanadium recovery, 10: 674(R)
- analysis, comparison of NBS and Mallinckrodt procedures for, 10: 3445
- analysis for U and Th, 10: 2392
- analysis of, and acid, carbonate, and organic leaching, 10: 660(R)
- analytical errors and Pb isotope/U isotope ratio age distribution, 10: 2712(J)
- analytical service and research methods, 10: 2067(R)
- application of resin-in-pulp process to U recovery from, 10: 2660

## Uranium ores (cont'd)

- beneficiation and carbonate leaching of ores from Grants N. Mex., 10: 2982
- calcination, organic leaching for U and V recovery, 10: 716(R)
- carbonate leaching, 10: 2985
- carbonate leaching, efficiency of, 10: 1299
- carbonate leaching, review, 10: 3118
- carbonate leaching for U recovery, 10: 661, 2658
- exploration, statistical problems, 10: 1356
- flotation and leaching of products from high lime Utex ores, 10: 3273
- geological configurations and prospecting in Italy, 10: 1787(J)
- leaching tests on Monticello, 10: 742
- leaching with  $\text{HNO}_3$ , 10: 3563
- nonaqueous extraction methods, 10: 672(R)
- nonaqueous extractive methods for leaching U from, 10: 674(R)
- nonaqueous extractive methods for U and V recovery, 10: 675(R)
- nonaqueous extractive methods for western, 10: 671(R)
- organic and acid leaching and chlorination of, U and V extraction by, 10: 670(R)
- organic leaching, 10: 679(R)
- organic leaching for U, 10: 717
- organic leaching for U and V recovery, 10: 715(R)
- organic leaching with amines, 10: 3186(R)
- pilot plant tests on Anaconda ore from Grants District, N. Mex., 10: 666
- polarographic analysis for U in presence of Fe, V, and Mo, 10: 1239
- polarographic determination of U in solutions of, interference of trace V and Mo on, 10: 81(R)
- processing, 10: 3612
- processing, ion exchange equipment, 10: 2326
- processing, operation of resin-in-pulp process pilot plant for, 10: 3344
- processing, recent development, lecture on, 10: 1287
- processing by aqueous and non aqueous leaching, 10: 714(R)
- processing for U and V recovery, 10: 3111
- processing for U recovery, 10: 107(R), 1286
- processing for U separation and recovery, 10: 3751(R)
- processing of Temple Mountain, for U and V production, 10: 662
- radiological monitoring, 10: 1465
- recovery of U by a char-in-pulp adsorption separation process, 10: 1321
- recovery of V in  $\text{HCl}$ -acetone systems, 10: 673(R)
- resin-in-pulp pilot plant testing, processing, 10: 67
- resin-in-pulp processing for U recovery, 10: 1302, 1303
- sampling methods, effects on assay results, 10: 3562
- separation and purification of reactor fuels from, 10: 734(J)
- solvent extraction and ion exchange processes for, recovery of U and V by, 10: 684(R)
- solvent extraction and organic leaching, 10: 2044(R)
- solvent extraction of U from, by organophosphates, 10: 2678
- spectrographic analysis for U and Th, 10: 1250(J)
- thermodynamic properties of  $\text{UO}_3$  and relation to oxidation states of, of Colorado plateaus, 10: 1786(J)
- two-stage sulfuric acid leaching of, 10: 2661
- uranium separation by ion exchange, 10: 3277
- uranium separation by solvent extraction with alkyl phosphate esters, 10: 3122

## Uranium ores (cont'd)

- vanadium recovery, nonaqueous extractive methods, 10: 671(R)
- vanadium recovery from acid leached, 10: 742
- Uranium(IV) oxalates
- solubility in  $\text{HCl}$ , 10: 2395
- Uranium(IV) oxide-beryllium oxide systems
- thermal conductivity, 10: 3616
- Uranium oxide slurries
- aqueous, preparation and properties, 10: 3551(R)
- extraction tests on mixtures of soda salt and  $\text{U}_3\text{O}_8$  spiked with impurities, 10: 1291(R)
- physical and plastic properties, 10: 2363
- preparation, 10: 3552
- thermal stability, 10: 3516
- Uranium(VI) oxide-sulfuric acid systems
- phase studies, 10: 1325(J)
- Uranium(VI) oxide-water systems
- x-ray-diffraction analysis, 10: 3026(R)
- Uranium oxides
- ceramic properties, review, 10: 2701(J)
- chemical determination, 10: 2384
- chemical reactions with  $\text{NH}_3$  and  $\text{HF}$ , 10: 3542
- crystal structure of  $\text{UO}_2 \cdot 8\text{H}_2\text{O}$ , 10: 501
- crystal structures of  $\text{UO}_2$  and  $\text{U}_3\text{O}_8$ , 10: 2390
- hydrofluorination, heat of reaction and equilibrium constants, 10: 3507
- magnesium reduction at  $500^\circ\text{C}$ , 10: 3345
- neutron absorption, 10: 2565
- phase studies of the  $\text{UO}_2$ - $\text{U}_3\text{O}_8$  system at high temperatures, 10: 2047(J)
- preparation and extraction of  $\text{UO}_4 \cdot 2\text{H}_2\text{O}$  from uranyl salts and in purification of uraniferous materials, 10: 1771(J)
- reduction, 10: 3542
- reduction to U metal, 10: 3000
- stability, diagram of, 10: 1786(J)
- thermodynamic properties, hardness, and decomposition, 10: 2359
- thermodynamic properties and relation to oxidation states of U ores, 10: 1786(J)
- Uranium(IV) oxides
- analysis, 10: 3454
- analysis for  $\text{U}^{4+}$  ions in phosphoric acid solution, 10: 3453
- analysis of nitrate solutions for  $\text{Th}^{2+}$ , 10: 3513
- chlorination to  $\text{UCl}_4$ , 10: 2365
- dissolution, a survey of methods, 10: 3428
- examination of du Pont and Mallinckrodt samples by electron microscopy, 10: 3765
- fluorination and oxidation, 10: 3561
- high-temperature heat content data for, 10: 2448
- high-temperature properties and applications, 10: 1345(J)
- high-temperature reactions with metal oxides, 10: 3185
- neutron resonance absorption, effect of temperature on, 10: 3647
- physical properties, 10: 3603
- preparation by reduction of  $\text{UO}_3$ , 10: 2364
- thermal conductivity, 10: 3616
- Uranium(IV-VI) oxides
- colorimetric analysis for Cd, 10: 2281
- colorimetric determination with use of  $\text{H}_2\text{O}_2$ , 10: 2304
- crystal structure, 10: 113(J)

## Uranium(IV-VI) oxides (cont'd)

- determination in Florida leached zone material, 10: 1720(R)
- extraction tests on mixture of soda salt and, spiked with impurities, 10: 1291(R)
- fluorination to  $UF_4$ , 10: 2386
- fluorination to  $UF_6$ , preparation of  $CoF_3$  for, 10: 3534
- preparation of primary standards of, by ignition of U compounds in air at  $1000^\circ C$ , 10: 3001

## Uranium(VI) oxides

- chlorination, 10: 3527(R)
- chlorination by organic chlorocarbons, 10: 3540
- chlorination with  $CCl_4$  or thionyl chloride to prepare  $UCl_4$ , 10: 3539
- crystal structure, 10: 501
- high-temperature heat content data for, 10: 2448
- infrared spectra of hydrated, 10: 1768(J)
- preparation by high-pressure oxidation of  $U_3O_8$ , 10: 3547
- preparation of reactive, 10: 3052(P)
- production and physical properties, effect of pre-treatment of  $UO_2(NO_3)_2$  on, 10: 3520
- reaction with hexachlorophene, 10: 2373, 3569
- reduction-chlorination in glass fluidizer, 10: 3545
- solubility in aqueous  $H_2SO_4$ , 10: 1325(J)

## Uranium-oxygen systems

- phase studies, 10: 3185

## Uranium peroxides

- formation, infrared spectra, and chemical properties, 10: 1768(J)
- precipitation, effects of stirring, pH, and  $H_2O_2$  used on, 10: 2364
- solubility in aqueous solutions, effects of  $SO_4^{2-}$ ,  $H^+$ , and  $H_2O_2$  concentrations on, 10: 3544
- thermal decomposition, 10: 3528(R)

## Uranium phosphates

- precipitation from acid leach liquors, 10: 107(R)

## Uranium-platinum alloys

- phase studies, 10: 3603

## Uranium-platinum couples

- thermal emf of, 10: 2441

## Uranium-plutonium alloys

- vacuum distillation of, for Pu and U separation, 10: 2074

## Uranium powders

- preparation, 10: 1827(J)
- reaction mechanisms, 10: 3124

## Uranium Production Reactor

- neutron flux distribution of, from exponential experiments, 10: 2544(R)

## Uranium reserves

- occurrence in Granite Point Claims and Moonlight Mine, 10: 3007

## Uranium reserves (N.C.)

- occurrence in Cleveland and Lincoln Cos., 10: 804
- occurrence in Knob Creek Monazite Placer, 10: 1357

## Uranium reserves (S. Dak.)

- occurrence, 10: 1789(J)

## Uranium reserves (Tenn.)

- occurrence in Chattanooga Shale, 10: 2062(R)

## Uranium-ruthenium alloys

- phase studies, 10: 3603

## Uranium salts (liquid)

- centrifugal separation, 10: 3558

## Uranium-silicon systems

- fabrication and phase studies, 10: 3059(P)

## Uranium-silver alloys

- alloying theory, 10: 3361
- liquid metal extraction for Pu, 10: 2379

## Uranium slurries

- viscosity, 10: 2398

## Uranium-thorium alloys

- analysis for Th, 10: 3549
- thermal conductivity, 10: 3616

## Uranium-tin-zirconium alloys

- analysis for Sn in, microtechnique, 10: 613

## Uranium-titanium alloys

- spectrophotometric analysis for uranium, 10: 1233

## Uranium-titanium-zirconium alloys

- spectrophotometric analysis for uranium, 10: 1233

## Uranium-uranium bromide systems

- liquid solid phase equilibrium region, thermal analysis of, 10: 3755

## Uranium-vanadium sandstone deposits

- occurrence in Col., S. Dak., N. Dak., Wyo., 10: 3130(R)

## Uranium-vanadium sandstone deposits (Ariz.)

- occurrence in Chinle Formation, 10: 796

## Uranium-vanadium sandstone deposits (Colo.)

- occurrence in Atkinson Creek Quadrangle, 10: 1360(J)
- occurrence in Calamity Mesa Quadrangle, 10: 157(J)
- occurrence in Egnar Quadrangle, 10: 158(J)
- occurrence in Gypsum Gap Quadrangle, 10: 154(J)
- occurrence in Hamm Canyon Quadrangle, 10: 155(J)
- occurrence in Joe Davis Hill Quadrangle, 10: 156(J)
- occurrence in Red Canyon quadrangle, 10: 159(J)
- occurrence in Skull Creek Area, 10: 1351

## Uranium-vanadium sandstone deposits (Colo.-Utah)

- occurrence, 10: 806

## Uranium-vanadium sandstone deposits (N. Mex.)

- occurrence in Church Rock Area, 10: 2063
- occurrence in Morrison Formation of Zuni Uplift, 10: 799

## Uranium-vanadium sandstone deposits (S. Dak.)

- occurrence, 10: 1789(J)
- occurrence in Cedar Canyon, 10: 1790(J)

## Uranium-vanadium sandstone deposits (Utah)

- occurrence in Dripping Springs Area, 10: 798
- occurrence in Kaiparowits Plateau Area, 10: 797
- occurrence in Little Rockies District, 10: 800
- occurrence in San Juan Co. 10: 1350
- occurrence in Temple Mountain District, 10: 1785(R)

## Uranium-zinc alloys

- equilibrium phase regions in, 10: 3196(R)
- phase studies, 10: 3011

## Uranium-zirconium alloys

- creep and tensile properties at  $500^\circ F$ , 10: 831
- electric and thermal conductivity, 10: 2437
- electric conductivity, effects of irradiation, temperature, and cold work, 10: 1399
- etching in  $HNO_3$  baths, explosive properties, 10: 1766
- explosions in pickling and etching, 10: 3615
- explosive reactions with nitric acid during etching, 10: 3526



## Uranium-zirconium alloys (cont'd)

hardness survey at temperatures from room temperature to 900°C, 10: 3359

thermal conductivity, 10: 3616

## Uranium-zirconium alloys (clad)

explosions in pickling and etching, 10: 3615

## Uranocircites

crystallography, 10: 2066

## Uranyl ammonium phosphates

(See Ammonium uranyl phosphates.)

## Uranyl carbonates

chemical properties in aqueous solutions, review, 10: 3118

## Uranyl compounds

infrared spectra, 10: 1768(J)

in solution, radiometric analysis for U, 10: 3434(R)

## Uranyl fluorides

distillation and purification, 10: 3548

pyrohydrolytic analysis for F and U, 10: 615

solvent properties for O<sub>2</sub> and H<sub>2</sub> at elevated temperatures, 10: 2681

solvent properties for O<sub>2</sub>, H<sub>2</sub>, and He, 10: 3121

volumetric determination in UF<sub>4</sub> samples, 10: 3512

## Uranyl ions

chemical reactions in alkaline solutions, 10: 3525

colorimetric determination, 10: 2273

exchange of U between U<sup>2+</sup> and UO<sub>2</sub><sup>2+</sup>, 10: 3571

ion exchange separation from plant waste solutions, 10: 3491

potentiometric determination, 10: 3424

## Uranyl nitrate-ammonium hydroxide systems

phase studies of aqueous solutions, 10: 746

## Uranyl nitrate-nitric acid-water systems

phase studies, 10: 1315

## Uranyl nitrate-water systems

freezing point, 10: 2381, 2382

## Uranyl nitrates

analysis by gravimetric, volumetric, and conductance methods, 10: 3528(R)

analysis for uranium, 10: 3533

chemical stability, 10: 1765

conductivity in ethyl ether solutions, 10: 2272(R)

corrosive effects on stainless steel, 10: 2430

extraction by ether in a spray column, 10: 1326(J)

hydrates, heats of solution in dimethyl formamide, 10: 2256(R)

precipitation by H<sub>2</sub>O<sub>2</sub>, 10: 1817

purification by diethyl ether extraction, 10: 3483

pyrolysis to UO<sub>3</sub>, effect of ether extraction on, 10: 3520

radiometric analysis, sample preparation, 10: 2375

solubility in ethyl acetate, 10: 3528(R)

solvent extraction with dibutyl carbitol, 10: 3543

solvent extraction with hexone, 10: 2331

titrimetric analysis for HNO<sub>3</sub> in UNH, 10: 2285

## Uranyl phosphate complexes

spectrophotometric analysis in HClO<sub>4</sub> solutions, 10: 2685

## Uranyl phosphates

solubility in nitrate solutions at 96°C, 10: 3574

## Uranyl sulfate-water systems

criticality studies for HRE, 10: 3700

## Uranyl sulfate-water systems (cont'd)

purification by electrolysis, 10: 3346

## Uranyl sulfates

electrometric titration of, in presence of H<sub>2</sub>SO<sub>4</sub> and NaOH, 10: 150

hydrogen ion concentration of aqueous solutions from 25 to 60°C, 10: 2684

precipitation by H<sub>2</sub>O<sub>2</sub>, 10: 1817

solubility in organic solvents, 10: 3180(R)

solvent properties for H<sub>2</sub> at elevated temperatures, 10: 2680

solvent properties for O<sub>2</sub>, H<sub>2</sub>, He, and Xe, 10: 3121

## Uravan District (Colo.)

geology, area favorable for U deposits, 10: 1361(J)

## Uravan ores

(See Carnotites.)

## Urea

acidic properties in liquid NH<sub>3</sub>, 10: 1223(J)

## Urea, thio-

acidic properties in liquid NH<sub>3</sub>, 10: 1223(J)

## Uric acid

fixation of CO<sub>2</sub> into, mechanism for, 10: 3143(R)

## Urine

analysis for fission products by ion exchange, 10: 3440

analysis for glycoproteins, 10: 2636(J)

analysis for strontium, techniques for, 10: 3143(R)

analysis for U, 10: 3175

chemical constituents in, effects of total-body irradiation on, in rats, 10: 28(J)

electrodeposition of U in, 10: 3175

fluorimetric determination of U in, 10: 3460

radiometric analysis, statistical analysis of results, 10: 2286

radiochemical analysis of, for Ba and Sr isotopes, 10: 612

radiometric analysis for Po, 10: 2278

radiometric analysis for Pu, application of nuclear emulsions to, 10: 2294

radiometric analysis of, for  $\alpha$  emitters, 10: 606

radiometric analysis of, for Sr<sup>89</sup>, 10: 42(R)

## Utah

geophysical exploration, geology, and U distribution in Emery, Grand, San Juan, and Wayne Cos., 10: 806

photogeologic map of Desert Lake Quadrangle in Carbon and Emery counties, 10: 169(J)

photogeologic map of Desert Lake Quadrangle in Emery and Carbon counties, 10: 168(J)

uranium deposits in Grand Co., area favorable for, 10: 1361(J)

## Utah (Carbon Co.)

photogeologic map of Woodside Quadrangle in, 10: 1792(J)

## Utah (Daggett Co.)

geologic map of Flaming Gorge Quadrangle in, 10: 812(J)

## Utah (Emery Co.)

exploration of Temple Mountain District in, 10: 1785(R)

geophysical exploration of Dripping Springs Area in, 10: 798

photogeologic map of Desert Lake-6 Quadrangle in, 10: 813(J)

photogeologic map of Desert Lake-7 Quadrangle in, 10: 814(J)

photogeologic map of Desert Lake-9 Quadrangle in, 10: 815(J)

photogeologic map of Desert Lake-10 Quadrangle in, 10: 816(J)

photogeologic map of Desert Lake-11 Quadrangle in, 10: 817(J)

photogeologic map of Desert Lake-12 Quadrangle in, 10: 818(J)

## Utah (Emery Co.) (cont'd)

- photogeologic map of Moab Quadrangle in, 10: 1800(J)
- photogeologic map of Tidwell Quadrangle in, 10: 1791(J), 1794(J), 1795(J), 1796(J), 1797(J)
- photogeologic map of Tidwell-6 Quadrangle in, 10: 820(J)
- photogeologic map of Woodside Quadrangle in, 10: 1792(J), 1793(J)

## Utah (Garfield Co.)

- exploration of northwest rim of Colorado River Basin in, 10: 800

## Utah (Grand Co.)

- photogeologic map of Moab Quadrangle in, 10: 1798(J)
- photogeologic map of Moab-11 Quadrangle in, 10: 819(J)
- photogeologic map of Tidwell Quadrangle in, 10: 1796(J)

## Utah (San Juan Co.)

- photogeologic map of Elk Ridge Quadrangle in, 10: 167(J)

## Utah (Juab, Millard, Sanpete, and Tooele Cos)

- geophysical exploration of Sheeprock Mountains Area and Thomas Range in, 10: 803

## Utah (Kane Co.)

- geophysical exploration of Kaiporowits Plateau Area in, 10: 797

## Utah (San Juan Co.)

- geology of Happy Jack Mine in, 10: 160(J)
- geophysical exploration of Sun Flower and Snow Flake Claims, Lucky Strike and Peterino Claims and Yellow Circle Area in, 10: 1350
- photogeologic map of Aneth Quadrangle in, 10: 162(J), 163(J), 164(J), 165(J), 166(J)
- pitchblende deposits in White Canyon Area in, 10: 150

## Utah (Wayne Co.)

- exploration of northwest rim of Colorado River Basin in, 10: 800

## Utah. Univ., Salt Lake City. Radiobiology Lab.

- progress reports, 10: 1160(R)

## V

## V particles

(See also S particles.)

- analysis of events obtained with magnetic cloud chamber, 10: 2098(J)
- angular correlation effects of decay, 10: 1485(J)
- decay, anomalous, 10: 2137(J)
- lectures on, by B. Rossi, 10: 324(J)

## Vacuum furnaces

- design for analysis of cermets, 10: 789
- evaluation, method for, 10: 1833(J)
- for tensile testing at high temperatures, 10: 1446

## Vacuum pumps

- high-conductance cold trap for, design, 10: 144(J)
- Kinney, performance tests on oils for, 10: 3586

## Vacuum systems

- for air sampling, design and performance, 10: 3411
- design of, for high-temperature tensile furnace, 10: 1446
- design of high-conductance cold trap for diffusion pumps in, 10: 144(J)
- leak detection in, instrumentation, 10: 3082(P)
- plastics used in design of, 10: 3205
- release of liquid H<sub>2</sub> in, safety hazards from, 10: 919

## Vacuum valves

- butterfly, with large effective aperture, 10: 122(J)

## Vacuum valves (cont'd)

- design of pneumatically operated, for mass spectrometers, 10: 3027

## Valine

- synthetic, chemical properties, 10: 3104

## Valves

(See also Vacuum valves.)

- corrosion in sulfamic acid solutions, 10: 2433
- design, leaks, and operating control, 10: 757
- design of bellows and disc, 10: 644
- design of combined connect and disconnect, 10: 1775(R)
- design of variable leak for monitoring of gaseous diffusion process, 10: 3203
- mercury-safety, for electrolysis of heavy water, 10: 2792(J)
- testing for SIR coolant system, 10: 120(R)
- for uranium hexafluoride handling, performance, 10: 2358

## Van de Graaff accelerators

- design, improvements in, 10: 3657
- electric insulation failure repair, 10: 1837(R)
- energy calibration of ORNL, by nuclear reaction thresholds, 10: 320(R)
- operation, 10: 3655
- as thermal-neutron source for activation analysis, 10: 2632(J)

## Vanadium

- by-product recovery, 10: 682(R), 698(R)
- by-product recovery by precipitation from carbonate leach solutions, 10: 725
- by-product recovery from carnotites, 10: 697(R)
- by-product recovery from carnotites and Florida leached zone material, 10: 700(R)
- by-product recovery from carnotites by solvent extraction, 10: 704(R)
- by-product recovery from leach solutions by solvent extraction, 10: 691(R)
- by product recovery from Lukachukai ore, 10: 684(R)
- by-product recovery from uranium leach solutions, 10: 2980
- by-product recovery from U ores, 10: 670(R), 672(R), 3111
- by-product recovery of, from Florida leached zone material, 10: 696(R)
- colorimetric determination, 10: 3459
- colorimetric determination in alkali hydroxides, 10: 3109
- colorimetric determination of trace amounts in U, 10: 81(R)
- determination in Al-V alloys, 10: 62

electrolytic-polarographic determination and analysis of trace metals in aqueous solutions of, 10: 85(J)

electrolytic precipitation from uranium leach solutions, 10: 2038

electrolytic separation from carbonate leach solutions by ion exchange, 10: 2664

electrolytic separation from leach liquor, 10: 2690, 2992, 3115

ion exchange for recovery from slime ore pulps, 10: 2986

ion exchange recovery from acid leach solutions from U ore stockpiled at Monticello, Utah, 10: 687

lattice spacings of solid solutions, in  $\alpha$  iron, 10: 2087(J)

neutron-capture  $\gamma$ -ray spectrum, 10: 2174(J)

neutron resonances, 10: 3655

neutron scattering, correlation with Debye model, 10: 1852(J)

oxidation with NaClO and absorption spectra of, 10: 705(R)

physical and metallurgical properties, 10: 2434

potentiometric determination in acid leach solutions, 10: 1888

preparation by crystal bar process, 10: 3196(R)

## Vanadium (cont'd)

- production from Temple Mountain ores, 10: 662
- proton scattering and energy levels, 10: 2157(J)
- recovery by ion-exchange methods, 10: 703(R)
- recovery from acid leaching of U ore, 10: 742
- recovery from carnotites, 10: 669(R)
- recovery from leach solutions of carnotite ores, 10: 695(R)
- recovery from Lukachukai ore by organic phosphates, 10: 679(R)
- recovery from ores by solvent extraction, 10: 687(R)
- recovery from U acid leach residues and precipitates by salt roasting, 10: 665
- recovery from U ores, nonaqueous extractive methods, 10: 671(R)
- recovery from U ores by organic leaching, 10: 681(R)
- recovery of, as a by-product of U production, 10: 683(R), 686(R), 699(R)
- recovery of, from acid slurries of Lukachukai ore, by solvent extraction, 10: 692(R)
- solvent extraction from carnotites, 10: 705(R), 706(R), 707(R)
- solvent extraction from carnotites with TBP, 10: 694(R)
- solvent extraction from leach solutions of carnotites, 10: 701(R)
- solvent extraction from U ores, 10: 675(R)
- solvent extraction of, as a by-product of U production, 10: 693(R)
- solvent extraction of, from carnotite leach solutions, 10: 708(R), 710(R)
- solvent extraction of, from plateau and Utex ores, 10: 712(R), 713(R)
- solvent extraction of, from plateau ore leach solutions, 10: 715(R), 716(R)
- solvent extraction of, from plateau ores, 10: 714(R)
- solvent extraction of, from U leach solutions, 10: 711(R)
- spectrophotometric determination in Al-V alloys, 10: 79
- titrimetric determination in vanadium-containing plant-digestion liquors, 10: 2272(R)

## Vanadium-aluminum alloys

- analysis for V, 10: 62
- spectrophotometric determination of V in, 10: 79

## Vanadium-aluminum-titanium alloys

- notch sensitivity of weld heat affected zones, microstructure, and transformation curves, 10: 1811

## Vanadium-beryllium alloys

- crystal structure of  $\text{VBe}_{12}$ , 10: 911(J)

## Vanadium carbide-titanium carbide-zirconium carbide systems

- physical properties, 10: 788

## Vanadium complexes

- with salicylaldehyde and amino acids, preparation and properties, 10: 749(J)

## Vanadium-iron-titanium alloys

- phase studies, 10: 172

## Vanadium isotopes

- relative abundance of 50, 51, 10: 3745(R)

Vanadium isotopes  $\text{V}^{50}$ 

- radioactivity, 10: 1601

Vanadium isotopes  $\text{V}^{51}$ 

- energy levels, and decay of  $\text{Cr}^{51}$ , 10: 2932(J)
- excited states, determination by inelastic proton scattering, 10: 1506(R)
- neutron scattering and total cross sections, 10: 2496
- proton reaction (p,n), neutron yield and angular distribution, 10: 399(J)

Vanadium isotopes  $\text{V}^{51}$  (cont'd)

- proton reactions (p,n), and neutron angular distributions and yields, 10: 3144(R)

## Vanadium oxides

- stability, diagram of, 10: 1786(J)

## Vanadium reserves (S. Dak.)

- occurrence, 10: 1789(J)

## Vanadium-tantalum alloys

- phase studies, 10: 3196(R)

## Vanadium-uranium sandstone deposits

- occurrence in Col., S. Dak., N. Dak., Wyo., 10: 3130(R)

## Vanadium-uranium sandstone deposits (Ariz.)

- occurrence in Chinle Formation, 10: 796

## Vanadium-uranium sandstone deposits (Colo.)

- occurrence in Atkinson Creek Quadrangle, 10: 1360(J)
- occurrence in Calamity Mesa Quadrangle, 10: 157(J)
- occurrence in Gypsum Gap Quadrangle, 10: 154(J)
- occurrence in Hamm Canyon Quadrangle, 10: 155(J)
- occurrence in Red Canyon Quadrangle, 10: 159(J)
- occurrence in Skull Creek Area, 10: 1351

## Vanadium-uranium sandstone deposits (Colo.-Utah)

- occurrence, 10: 806

## Vanadium-uranium sandstone deposits (N. Mex.)

- occurrence in Church Rock Area, 10: 2063
- occurrence in Morrison Formation of Zuni Uplift, 10: 799

## Vanadium-uranium sandstone deposits (S. Dak.)

- occurrence, 10: 1789(J)
- occurrence in Cedar Canyon, 10: 1790(J)

## Vanadium-uranium sandstone deposits (Utah)

- occurrence in Dripping Springs Area, 10: 798
- occurrence in Kaiparowits Plateau Area, 10: 797
- occurrence in Little Rockies District, 10: 800
- occurrence in San Juan Co. 10: 1350

## Vanaking No. 1 Mine (Colo.)

- occurrence in Gateway Quadrangle, 10: 1359(J)

## Vapor pressure

- equipment for measuring, 10: 2570

## Vaporization

- measuring method for diffusion constants and expansion of, 10: 898(J)
- study by optical and micropolarization method of, 10: 2040(J)

## Vegetation

- contamination with  $\text{I}^{131}$ , effect of consumption on sheep, 10: 3410

## Vein deposits

- geologic investigations for radioactive, 10: 2067(R)
- occurrence in Granite Point Claims and Moonlight Mine, 10: 3007

## Vein deposits (Colo.)

- occurrence in Eureka Gulch Area, 10: 1363(J)

## Vermejo Formation (Colo.)

- geology, 10: 1352

## Vernal Area (Utah)

- uranium occurrence, 10: 151

## Versene acid

(See Acetic acid, (ethylenediamine) tetra-)

## Vibration testing

(See also appropriate subheadings under specific devices.)



## Vibration testing (cont'd)

measuring amplitude of the oscillation of a vibrating body, instrument for, 10: 3084(P)

## Vibrations

effects on grain structure of Al-Cu alloys, 10: 180

production by an electromagnetic vibration exciter, 10: 1331

## Vinyl compounds

(See also specific compounds.)

polymerization, radiochemical, 10: 1282(J)

polymerization of, radiation induced, 10: 1281

radiation effects on polymers of, 10: 1283(J)

## Virginia

geology, radiometric reconnaissance, 10: 2064

## Virginium

(See Francium.)

## Virtual coefficients

of helium mixtures,  $\text{He}^3$ - $\text{He}^4$ , between 2 and 4°K, 10: 1417(J)

## Viruses

effects of radiation on, 10: 38(J)

## Viscometers

design of piezoelectric, for liquid metals and salts, 10: 780

## Viscosity

of molten metals, instruments for measuring, 10: 780

## Viscous flow

(See Fluid flow (laminar).)

## Vitamins

supplemented by antibiotics, effects on survival of irradiated dogs, 10: 3255

## Vitro Corp. of America, New York.

progress reports on gasket development, 10: 2403(R)

## Voids

(See Reactor shield voids.)

## Voltage regulators

design and performance, for calutron, 10: 3140

polyphase, design and operation, 10: 3082(P)

theory, 10: 927

## Voltmeters

design and performance for reactor instrumentation, 10: 2467

## Volumetric analysis

titrimetric procedures, laboratory manual, 10: 1748(J)

## W

## W-305 Reactor

(See Hanford Test Reactor.)

## W-105 Reactors

(See Hanford Production Reactors.)

## Waste disposal

(See also Sewage; Stack disposal.)

in control of radioactive contamination, 10: 1713(J)

by injection into geological formations, 10: 1327(R)

of laboratory waste, procedures employed at KAPL, 10: 1772

liquid storage, efficiency of and field exploration for, 10: 43(R)

by liquid storage, heat transfer, 10: 2396

by liquid storage, solution sampling, 10: 3577

## Waste disposal (cont'd)

marine burial, monitoring, 10: 755(J)

nitrogen oxides removal, 10: 3292

of nuclear power plants, design estimates, 10: 3248

precipitates from, ammonium nitrate decomposition, 10: 3443

research at Hanford, 10: 3409(R)

storage pit exploration, 10: 42(R)

## Waste disposal conferences

held in Baltimore, Maryland, April 15 and 16, 1954, 10: 2610

## Waste processing

activated sludge for U recovery, 10: 3341

at AEC sites, summary, 10: 2610

chemical methods for, general description, 10: 1773(J)

concentration of fluoride process wastes, 10: 2397

by co-precipitation, 10: 1328

by evaporation, 10: 2252(R)

filtration of laundry wastes containing fission products, 10: 754

by fixation of radioisotopes by algae and bacteria in oxidation ponds, 10: 3101

at the Idaho Chemical Processing Plant, equipment for, 10: 115

by incineration, 10: 116

incineration, flow sheet, 10: 3126

by ion exchange, 10: 3491

precipitation, in recovery of U, 10: 3579

of reactor fuel elements, and concentration of fission products, 10: 1330(J)

serial coagulation of radioactive materials from  $\text{H}_2\text{O}$ , 10: 42(R)

sludge sampler for Hanford, 10: 3578

## Waste slurries

(See Hanford waste slurries.)

## Waste solutions

beta monitoring, automation in, 10: 3125

sampling of high-activity, 10: 3577

spectrographic analysis for TBP, 10: 3439

## Water

(See also Body water; Ground waters; Sea Water; Steam.)

absorption of nitrogen oxides in, 10: 77(J)

adsorbed on B, determination, 10: 3421

adsorption in concentrated alkali chloride-HCl solutions, 10: 2668(J)

analysis for U, 10: 3175

borated, mixing at Lid Tank Facility, 10: 3312

chemical reactions with molten Al under reactor conditions, 10: 587

contamination by fall-out, 10: 2593

corrosive effects, fabrication of capsules for study, 10: 1507(R)

corrosive effects of 500 and 600°F, on various metals and alloys, 10: 1806

corrosive effects on Al and Al alloys, effects of coagulants, 10: 2431

corrosive effects on Cu, 10: 2704

corrosive effects on stainless steel, 10: 2432

corrosive effects on stainless steel, Al, and Be alloys of deionized and borated, 10: 3006

corrosive effects on Zr, alloying effects, 10: 2072

corrosive effects on Zr alloys, 10: 858(R)

criticality effects in BeO-moderated reactors, 10: 3707

decontamination, 10: 2610

decontamination of, by absorption of organic complexes on carbon, 10: 43(R)

## Water (cont'd)

- decontamination of autoclave, after U fuel slug rupture, 10: 2512(R)
- determination of small quantities of alkali metals in, design of a continuous monitor for, 10: 84
- dissociation, effects of neutron irradiation on, 10: 3658
- distillation for production of water- $d_2$ , 10: 202
- electrolysis, 10: 2329(R)
- exchange reactions with deuterium and with i-propyl mercaptan, and solubility of i-propyl mercaptan in, 10: 3462
- fast-group diffusion coefficient for, 10: 1047
- flow in natural circulation boilers, 10: 765(J)
- formation of oxygenated, in aqueous solutions containing  $O^{18}$  by  $\gamma$  radiation, 10: 100(J)
- gamma attenuation, measurements in MTR mock-up, 10: 2560
- gamma transmission through air slots in, 10: 3394
- heat transfer data, 10: 2053
- heat transfer to, in annular flow, 10: 2697(J)
- high-temperature reactions with metals, importance in reactor operation, 10: 1034
- isotopic exchange reactions with H isotopes, tables of, 10: 63
- lubricating properties for bearing materials, 10: 3188(R)
- luminescence, gamma radiation effects on, 10: 3478
- molecular structure, extension of Thomas-Fermi atomic model to, 10: 2226
- neutron and  $\gamma$  attenuation in  $B_4C$  and borated  $H_2O$  shield, 10: 3676
- neutron attenuation, UNIVAC calculations, 10: 313
- neutron attenuation in, 10: 1504(J)
- neutron attenuation in, in mixture with  $U^{235}$ , 10: 2858
- neutron diffusion lengths in, calculation, 10: 3220
- neutron distributions around air slots in, 10: 3397
- neutron dose buildup factor in, 10: 3645
- neutron energy spectra, 10: 3377
- neutron transmission through air slots in, effect of vertical position of single offset on, 10: 3395
- radiation effects, 10: 2977
- radiation effects, detection of hydrogen peroxide produced by, 10: 2027(J)
- radiation effects and dissociation by ionization, 10: 3480
- radioactivity induced in, 10: 3708
- radioactivity induced in MTR process, 10: 2509(R)
- radiolysis, effect of  $Br^-$  on peroxide yield from, 10: 1274(J)
- radiolysis of solutions of KBr and acrylonitrile in, by x and  $\gamma$  radiation, 10: 98(J)
- shielding properties, and neutron and  $\gamma$  attenuation in Fe,  $B_4C$ , and borated  $H_2O$  systems, 10: 3742
- solubility of uranyl ammonium phosphate in, 10: 3555
- solvent properties for  $H_2$  at elevated temperatures, 10: 2680
- solvent properties for  $O_2$ ,  $H_2$ , He, and Xe, 10: 3121
- solvent properties of  $d_2$ -labeled, for Xe and  $D_2$ , 10: 3121
- surface tension and viscosity effects on condition of heat exchange at boiling point of, 10: 1339(J)

## Water-d

- corrosive effects on aluminum alloys, 10: 3592
- neutron attenuation in, 10: 1504(J)
- solubility of, and deuterium organic compounds, over wide range of temperatures, 10: 2018(J)

Water- $d_2$ 

- distillation and purification, 10: 3548

Water- $d_2$  (cont'd)

- electrolysis, design of Hg safety valve for, 10: 2792(J)
- fast neutron attenuation, 10: 3379(R)
- isotopic equilibration analysis, 10: 3430
- lattices, neutron age measurements in, 10: 3314(R)
- neutron diffraction analysis, 10: 3653(R)
- neutron energy spectra, 10: 3377
- neutron energy spectrum from homogeneous source in, 10: 3142
- neutron scattering, 10: 3315(R)
- photoneutron yield from  $U^{233}$ ,  $U^{235}$ , and  $Pu^{239}$  fission products in, 10: 2860(J)
- production at gaseous diffusion plant sites, feasibility, 10: 3464
- production by  $D_2$  exchange between  $PH_3$  and  $H_2O$ , 10: 2308
- production by high-temperature distillation, 10: 2975
- production by natural water distillation by use of wetted-wall type of packing, 10: 202
- production of, reaction towers in water electrolysis plants for, calculations, 10: 2692(J)
- production plant design, 10: 628
- thermal neutron diffusion length, 10: 3379(R)
- viscosity from 50 to 95°C, 10: 3463
- Water-aluminum systems
- fast-group diffusion coefficient for, 10: 1047
- Water-beryllium systems
- neutron age, 10: 2139
- Water boiler neutron sources
- danger coefficient measurements of, 10: 2544(R)
- Water-carbon dioxide systems
- phase studies, 10: 821(J)
- Water-hydrogen peroxide systems
- radiation chemistry, 10: 3339
- Water- $d_2$ -hydrogen peroxide systems
- radiation chemistry, 10: 3339
- Water-iron systems
- gamma attenuation, 10: 2508
- Water-methanol systems
- scattering of x rays by, 10: 1096(J)
- Water moderated reactors
- (See also specific water moderated reactors.)
- criticality studies, 10: 3656
- criticality studies and neutron flux distribution in, with  $H_2O$ ,  $D_2O$ , and Be reflectors, 10: 3230
- intracell neutron flux traverses, 10: 3227
- self-regulation by moderator boiling in stainless steel -  $UO_2$ , 10: 3150
- Water-nitric acid-uranyl nitrate systems
- phase studies, 10: 1315
- Water purification equipment
- effectiveness in removal of fall-out, 10: 2593
- Water-sodium hydroxide-sodium nitrate systems
- phase studies, 10: 1731(J)
- Water-steam systems
- density and velocity measurements on boiling, 10: 2054
- heat transfer to, during forced flow through heated tube, 10: 2054
- pressure effects on velocity and density, 10: 3352
- Water-uranyl nitrate systems
- freezing point, 10: 2381, 2382

## Water-uranyl sulfate systems

- criticality studies for HRE, 10: 3700
- purification by electrolysis, 10: 3346

## Water vapor

(See also Steam.)

- chemical reactions with Th, 10: 62
- ionization, piezoelectric and electrical field effects, 10: 1415(J)

## Water-zirconium systems

- spatial distribution of Po-Be thermal neutrons in, 10: 431(J)

## Wave mechanics

- calculation of energy of many-Fermion systems, 10: 487
- isotopic spin impurity in light nuclei, 10: 347(J)
- relativistic, theory of, 10: 3144(R)

## WBNS

(See Water boiler neutron sources.)

## Weighing

(See Balances.)

## Welded joints

- corrosion in 500 and 600°F water, 10: 1806
- fabrication and corrosion properties, 10: 759
- fatigue and static properties of, in low alloy structural steels, 10: 2713

## Welds

- corrosive effects of HNO<sub>3</sub> and CuSO<sub>4</sub>-H<sub>2</sub>SO<sub>4</sub> systems on, 10: 147
- hot cracking in stainless steel, 10: 849
- tensile properties, in Ti and stainless steel, 10: 825(R)

## Westwater Canyon Member (N. Mex.)

- exploration, geology, and U occurrence, 10: 2063
- geology, 10: 799

## Wetting

- effects on molten metal heat transfer, 10: 769(J)

## White Canyon Area (Utah)

- geology, 10: 160(J)
- pitchblende deposits in, 10: 150

## White River Formation (S. Dak.)

- geology, 10: 1790(J)

## Windows

- blast effects from atomic explosions on, 10: 758
- design, for viewing radioactive substances, 10: 2024
- Hanford reactor face viewed by, 10: 386(J)

## Wingate Formation (Utah)

- geology, 10: 1784(R)
- geology of, in Dripping Springs Area, 10: 798

## Wires

- automatic scanner of, activated in MTR, 10: 381
- drawing of Ti alloy, 10: 1379

## Wolfram

(See Tungsten.)

## Woodside Quadrangle (Utah)

- photogeologic map of, 10: 1792(J), 1793(J)

## Wright Mines (Colo.)

- occurrence in Atkinson Creek Quadrangle, 10: 1360(J)

## Wyoming

- exploration and occurrence of U minerals, 10: 3130(R)

## Wyoming (cont'd)

- exploration of Shirley Basin Area in Albany, Carbon and Natrona counties, 10: 148
- geophysical exploration in Lincoln, Sublette, Sweetwater, and Uinta Cos. 10: 1354

## Wyoming (Lincoln Co.)

- exploration of Auburn Area in, 10: 151

## Wyoming (Sweetwater Co.)

- exploration of Burnt Fork Area in, 10: 151

## Wyoming (Uintah Co.)

- exploration of Vernal Area in, 10: 151

## X

## X radiation

(See also Gamma radiation; Photons.)

- absorption and emission by ferromagnetic metals, 10: 2956(J)
- absorption in tissues, 10: 2839(J)
- attenuation of 275-to 525-kv, in lead, aluminum, and concrete, 10: 1960(J)
- biochemical effects of, administered as single or divided dose to bone marrow nucleic acids in rats, 10: 1184(J)
- biochemical effects of, on mammalian tissues, 10: 536(R)
- biological effects, 10: 3166
- biological effects of high-energy, compared with effect of electrons in rats, 10: 1985(J)
- cataracts induced by exposure to, in rabbits, 10: 2580(J)
- cerebellar response to acute exposure to, in cats, 10: 1179(J)
- chemical syntheses produced by, 10: 1277(J)
- depth dosage determinations, 10: 1881(J)
- depth-dose curves, effects of interposed bone, 10: 2842(J)
- detection and measurement, field distortion in free-air ionization chambers for, 10: 2116(J)
- detection and measurement with scintillation counter, 10: 1469(J)
- diffraction, crystal fabrication for small angle, 10: 3291
- dosage determinations, 10: 516(R), 1883(J), 2604(J)
- dosimeters for, calibration, 10: 1880(J)
- dosimetry, 10: 3166
- dosimetry, performance of ionization chambers, 10: 2113(J)
- effects of exposure on formation of methemoglobin in rats, 10: 1989(J)
- effects of exposure to, on ascites tumors in mice, 10: 2588(J)
- effects of exposure to, on bacteriophages, 10: 516(R)
- effects of exposure to, on biosynthesis of deoxyribonucleic acid, in Vicia faba, 10: 32(J)
- effects of exposure to, on E. coli, 10: 526(J)
- effects of exposure to, on growth of bean roots, effects of atmospheric H on, 10: 539(J)
- effects of exposure to, on hatchability of eggs of Habrobracon, 10: 35(J)
- effects of exposure to, on intestinal glucose absorption in mice, 10: 531(J)
- effects of exposure to, on organic phosphate compounds in the lens, in rabbits, 10: 40(J)
- effects of exposure to, on rabbit's ear, 10: 529(J)
- effects of exposure to, on rat testis, 10: 34(J)
- effects of exposure to, on salivary glands in dogs, 10: 1164
- effects of exposure to mild doses of, over a long period of time, on behavioral and physiological changes in monkeys, 10: 520(J)



## X radiation (cont'd)

- effects of fractionated doses of, on rats, 10: 536(R)
- effects of in vitro exposure to, on desoxyribonucleoproteins, 10: 518
- effects of total-body exposure on sulfate metabolism, 10: 1183(J)
- effects of total-body exposure to, on endogeneous respiration in spleen and thymus glands of rats, 10: 37(J)
- effects of total-body exposure to, on incidence of bacteremia, in rabbits, 10: 36(J)
- effects of total-body exposure to, on tissue concentration of ascorbic acid in rats, 10: 523(J)
- effects of total-body exposure to, on urinary excretion pattern in rats, 10: 28(J)
- effects of whole-body exposure to, on blood-picture in monkeys, 10: 530(J)
- effects on bacterial penetration of intestinal wall in mice, 10: 3250
- effects on chicory seeds, 10: 23(J)
- effects on conductance of  $\text{HgI}_2$ , 10: 443(J)
- effects on cornea nerve elements, 10: 24(J)
- effects on diuresis in rats, 10: 3167
- effects on fusion in eggs of *Ascaris*, 10: 2587(J)
- effects on histamine excretion in rats, 10: 2967
- effects on  $^{125}\text{I}$ -labeled proteins and insulin, 10: 2608(J)
- effects on lymphocytes in suspension, 10: 1701(J)
- effects on mitotic rate in grasshopper neuroblasts, 10: 1988(J)
- exposure of salamander limbs to, regeneration after covering with unirradiated epidermis, 10: 521(J)
- focusing, bending crystals for, 10: 3291
- hazards to diagnostic workers, 10: 1708(J), 1709(J)
- ionization by within a cavity, theory, 10: 1472(J)
- lethal effects of, on rats, effects of age, 10: 20
- mesonic, from capture of  $\mu$  mesons by C and O, 10: 1484(J)
- molecular and radical yields of aqueous acrylamide solutions irradiated with, 10: 99(J)
- morphological changes in thymus gland induced by exposure to, in rats, 10: 1990(J)
- neoplasms induced following exposure to lethal doses of, in rats, 10: 1165
- pathological effects, modification of, in rats through shielding, 10: 1697
- pathological effects in mice, effects of leukocyte count, 10: 2574
- pathological effects of, on *E. coli*, effects of metabolites on, 10: 41
- pathological effects of, on rats, protection afforded by lead screens and mercaptoethylamine against, 10: 532(J)
- pathological effects of exposure to, on chick embryos, 10: 19
- pathological effects of whole-body exposure in sheep, 10: 2242(R)
- pathological effects on laboratory animals, 10: 3327(R)
- pathological effects on yeast, effects of anoxia, 10: 1193(J)
- photoneutron production by, in Pb, Sn, Cu, Fe, Al, C, and Be, 10: 1899(J)
- physiological effects as revealed by serological analysis, 10: 2575
- physiological effects in chicks, 10: 3327(R)
- polymerization of methacrylic acid induced by, 10: 1284(J)
- protective action to, by chemical agents, 10: 1167
- radioinduced chromosome pycnosis in *Tradescantia* following exposure to, 10: 528(J)
- radiolysis of water solutions by, 10: 98(J)
- scattering, metal fatigue determination by, 10: 1826(J)
- scattering, small angle by surface irregularities, 10: 1814(R)

## X radiation (cont'd)

- scattering by crystals, temperature variation of, 10: 1436(J)
- scattering by Pb crystals, temperature variation, 10: 1435(J)
- scattering by methanol-water systems, 10: 1096(J)
- scattering in gases, liquids, amorphous solids and polycrystals, theory, 10: 429(J), 430(J)
- spermatogonia degeneration following exposure to, in mice, 10: 2583(J)
- tissue dosage determinations for neutrons associated with, from 22.5-Mev betatron, 10: 2602(J)
- tumors induced by exposure to, 10: 2589(J)
- and ultraviolet radiation effect on albumin solutions, 10: 534(J)
- X-ray beams
  - angular spread of synchrotron, 10: 2180
- X-ray cameras
  - design, to obtain low angle diffraction photographs, 10: 2836(J)
  - design for analysis of cermets, 10: 789
  - specimen temperature measurement in powder, analysis of errors, 10: 2224(J)
- X-ray-diffraction analysis
  - (See also appropriate subheadings under specific materials.)
  - Hilger micro-focus equipment for, operational characteristics, 10: 3133
  - of irradiated fissile materials, 10: 2124(J)
  - method of analyzing powder diagrams to identify metallurgical compounds, 10: 485(J)
  - scintillation counting, use of shorter wavelengths in, 10: 1873(J)
  - surface preparation of U for, 10: 3762
- X-ray diffractometers
  - design for use with radioactive materials, 10: 1428
- X-ray monochromators
  - design for small angle diffraction studies, 10: 3291
- X-ray spectra
  - continuous measurement of, performance of scintillation spectrometers for, 10: 978(J)
  - energy distribution of, by the Laplace transform method, 10: 483
  - $\mu$  mesonic, for Cu and Pb, 10: 1123(J)
  - of nickel in Cu-Ni alloy foils irradiated with neutrons, 10: 1020(J)
- X-ray spectrometers
  - design of scintillation pair, 10: 1506(R)
  - performance of, in measurement of continuous x-ray spectra, 10: 978(J)
- X-ray spectroscopy
  - conversion tables for fluorescent, 10: 1616
- Xenon
  - adsorption on activated carbon, 10: 2338
  - poisoning of MTR by, and behavior of Xe concentration after a power reduction, 10: 2886
  - radiometric determination in dissolver off-gas, 10: 3324
  - solubility in  $\text{CCl}_4$ , 10: 1817
  - solubility in  $\text{H}_2\text{O}$ ,  $\text{D}_2\text{O}$ , and  $\text{UO}_2\text{SO}_4$  solution, 10: 3121
- Xenon isotopes  $\text{Xe}^{135}$ 
  - isolation of high-activity samples from fission products, 10: 2472
  - neutron absorption cross section, 10: 1580(J)
  - neutron cross section, 10: 1013
  - neutron fission cross sections, calculation, 10: 3220
  - reactor poisoning by, critical mass needed to over-ride, 10: 3728
- Xenon isotopes  $\text{Xe}^{136}$ 
  - isolation of, for use in light sources, 10: 2756(J)

## Y

## Yeasts

- cell-division time, 10: 1161(R)
- metabolism of P by *S. cerevisiae*, 10: 511
- radiosensitivity, effects of anoxia, 10: 1193(J)
- rupture with sonic oscillations and high pressure, 10: 3163

## Yellow Circle Area

- geophysical exploration, geology, 10: 1350

## Yellow Pine Mine (Nev.)

- mineralogy, 10: 1358

Ytterbium isotopes Yb<sup>169</sup>

- decay, 10: 1603(J)

Ytterbium isotopes Yb<sup>176</sup>

- decay schemes, 10: 2158(J)

## Yttrium

- colorimetric determination, 10: 625(J)
- determination, 10: 3433
- preparation by reduction of YF<sub>3</sub>, 10: 3196(R)
- purification, 10: 3026(R)
- thermal decomposition of neocupferron chelates, 10: 2856(J)

## Yttrium fluorides

- crystal lattice dimensions, 10: 3745(R)
- preparation by fluorination of the oxide, 10: 3196(R)

Yttrium isotopes Y<sup>88</sup>

- gamma spectra, 10: 1729(R)

Yttrium isotopes Y<sup>91</sup>

- isomeric states, production by inelastic neutron scattering, 10: 2190(J)
- isomers, production by inelastic neutron scattering, 10: 3034(R)

Yttrium isotopes Y<sup>90</sup>

- neutron activation cross section and decay curve, 10: 2449(R)
- neutron activation cross sections, 10: 1614(J)
- preparation of carrier-free, 10: 2794(J)
- produced *in vivo* from skeletal deposits of Sr<sup>90</sup>, in young dogs, 10: 558(J)

Yttrium isotopes Y<sup>91</sup>

- decay curve, 10: 2449(R)

## Yttrium oxyfluorides

- crystal lattice dimensions, 10: 3745(R)
- lattice energy, calculation, 10: 2768(J)

## Z

## Zeolites

- (See Anion exchange materials.)

## Zinc

- applied to Zr surfaces by immersion in molten ZrCl<sub>2</sub>, 10: 3358
- diffusion in single crystals of Ag, 10: 2789(J)
- diffusion of, on Zn, 10: 1386(R)
- gamma rays excited by inelastic scattering of 3.7-Mev neutrons in, 10: 3034(R)
- ion exchange on resins, effects of cross linkage on, 10: 1304(J)
- neutron reactions (n,p) at 14 Mev, cross sections, 10: 338(J)
- proton reaction (p,n) thresholds, 10: 397(J)
- separation from Ga, 10: 570(R)
- twinning, 10: 888(J)

## Zinc-antimony alloys

- diffusion of Sn in, 10: 869(J)

## Zinc bromides

- radiation effects on shielding windows of, with hydroxylamine hydrochloride, 10: 444(J)

## Zinc-carbon-manganese systems

- magnetic properties, 10: 1411(R)

## Zinc coatings

- electrodeposition on Be powders, 10: 3614

## Zinc fluorides

- heat capacity between 11 and 300°K and thermodynamic functions, 10: 1265(J)

## Zinc iodides

- potentiometric titration with K in liquid NH<sub>3</sub>, 10: 591(J)

## Zinc isotopes

- x-ray excitation of, 10: 331(R)

Zinc isotopes Zn<sup>60</sup>

- formation,  $\beta$  energy, and half life, 10: 1072(J)

Zinc isotopes Zn<sup>61</sup>

- formation and half life, 10: 1072(J)

Zinc isotopes Zn<sup>64</sup>

- proton reaction (p, $\gamma$ ) cross sections, 10: 402(J)

Zinc isotopes Zn<sup>67</sup>

- energy levels and spin assignments, 10: 1113(J)

Zinc isotopes Zn<sup>68</sup>

- neutron reaction (n, $\alpha$ ), cross section measurement, 10: 365(J)

Zinc isotopes Zn<sup>68</sup>

- nuclear isomerism, decay scheme, and coefficients of internal conversion electrons, 10: 472(J)

## Zinc sulfide crystals

- luminescence, injection of activators by diffusion into, 10: 595(J)
- preparation and properties for use as detectors, 10: 221

## Zinc sulfides

- alpha particle detection with, optimum conditions for, 10: 264(J)
- decay laws of afterglow, 10: 2847(J)
- phosphorescence, 10: 970(J)

## Zinc-uranium alloys

- equilibrium phase regions in, 10: 3196(R)
- phase studies, 10: 3011

## Zirconium

- analysis for Al, 10: 1737
- analysis for Si, 10: 3425
- bibliography on, 10: 2726
- bonding by hot rolling, 10: 3014
- casting, melting, and corrosion resistance in hot H<sub>2</sub>O, 10: 859(R)
- chemical analysis for common impurities in commercial-grade, 10: 1740
- chips, reclamation, 10: 3196(R)
- chlorination and reclamation, 10: 1215(R)
- compacting at sub-fusion temperatures, extrusion through graphite dies, 10: 3008
- compleximetric titration of, with use of ferric iron as titrant and disodium-1, 2-dihydroxybenzene-3,5-disulfonate as indicator, 10: 82
- corrosion, alloying effects on, in high-temperature steam and water, 10: 2072
- corrosion, fabrication, and mechanical properties, 10: 3013(R)
- corrosion, production, and reclamation, 10: 858(R)
- corrosion by 600 and 680°F water and steam, 10: 2077

## Zirconium (cont'd)

corrosion by steam, effects of temperature and pressure on, 10: 2077

corrosion by water at 450 and 560°F, effects of  $N_2$  on, 10: 3363

corrosion in 500 and 600°F water, 10: 1806

corrosion in high-temperature water, 10: 2059

corrosion in liquid Na at 1000°F, 10: 1775(R)

corrosion in 600°F  $H_2O$ , 10: 2703

corrosion of Zr and Sn - Zr alloys in, below 600°F, 10: 3611

corrosion rates and dimensional stability at high temperatures, 10: 1810

creep and tensile properties at 500°F, 10: 831

creep properties of, 10: 833

determination, 10: 3433

determination, bibliographies, 10: 1236

determination of, in aqueous  $F^-$  solutions with cupferron, 10: 620(J)

dissolution by  $H_2SO_4$  and  $HF-HNO_3$  systems, 10: 3129

ductility, effect of H on, 10: 3015

electric and thermal conductivity, 10: 2437

electric conductivity, effects of irradiation, temperature, and cold work, 10: 1399

electrodeposition from fused-salt baths, 10: 1367

electrodeposition from hydride-borohydride type baths, 10: 862(R)

electroplating of Al, Cr, and Ni on, replacement in coatings on, 10: 3358

emission spectrometric determination in Hf, 10: 1741(J)

etching for direct plating, 10: 3358

explosions in pickling and etching, 10: 3615

fabrication by powder metallurgy techniques, 10: 1828(J)

fluorimetric determination in U, 10: 3349

grain size determination by ultrasonic methods, 10: 854

impurities transferred during preparation by de Boer process, 10: 2714

inspection of, bibliography, 10: 3014

irradiation and cold working, effects on mechanical properties, 10: 838

metallurgical and mechanical property data for arc-melted crystal bar, 10: 3362(R)

physical and metallurgical properties, 10: 2434

polarization, 10: 561

powder metallurgy, 10: 2447

preparation, effects of  $ZrCl_4$  pretreatment and Na reductant-on, 10: 859(R)

preparation by calcium reduction of  $ZrF_4$  and properties, 10: 3197

preparation by reduction of  $ZrCl_4$  in a hydrogen glow discharge, 10: 1816

production, pilot-plant cost estimates, 10: 3135

production, purification, and separation from Hf, 10: 3016

production by bomb reduction of  $ZrF_4$ , 10: 634

production plant, economic aspects, 10: 3200

properties, fabrication, corrosion resistance, and alloys development, 10: 198(J)

properties and possibilities for use in thermal reactors, 10: 3602

purification by basic sulfate precipitation, 10: 3262

purity and Al, Fe, N, and Si content, 10: 1390

reactions with  $ZrCl_4$  vapor and  $NaCl-ZrCl_4$  systems, 10: 578

recovery from machine chips, 10: 3132

recrystallization, deformation, and grain growth characteristics, 10: 1815

resistivity, effect of fast neutrons on, 10: 2194

scaling at elevated temperatures, 10: 1805(R), 3280(R), 3281(R)

## Zirconium (cont'd)

separation by precipitation with phenolic acids, 10: 2638(J)

separation from Hf, 10: 3494(R)

separation from Hf, ion exchange, 10: 730(J)

separation from Hf, pilot-plant process, 10: 3135

separation from Hf, production plant, 10: 3200

separation from Hf, thiocyanate method, 10: 2994

separation from Hf by ether extraction of thiocyanate complexes, 10: 3182

separation from Hf by extraction of thiocyanate complexes, 10: 2995

separation from Hf by liquid-liquid extraction, 10: 3196(R)

separation from Hf by solvent extraction, 10: 3482

separation from Hf by solvent extraction with hexone, 10: 2996

separation from Hf by solvent extraction with TBP, 10: 2990

separation from Hf by thiocyanate extraction, 10: 3274

separation from Hf by use of complexing agents, 10: 2268

separation from Hf using TTA, 10: 3340

shell fabrication, methods for, 10: 3362(R)

solubility in liquid Bi, 10: 2440(R)

solvent extraction, operating characteristics of spray columns for, 10: 3482

solvent extraction from Hf, 10: 2989

solvent extraction from Hf with TBP, 10: 568(R)

spectrographic analysis of commercial, for rare earths, 10: 62

spectrophotometric determination, 10: 570(R)

spallation products, diffusion of, during high-temperature corrosion, 10: 2059

thermal conductivity, 10: 3616

tensile properties, 10: 1804

tensile properties of beta-annealed, 10: 188(R)

titrimetric determination in Mg and Mg alloys, 10: 2633(J)

titrimetric determination with EDTA, 10: 1236

uranium diffusion into, 10: 2679

vacuum induction-melted, 10: 1833(J)

## Zirconium (Cu clad)

extruded, factors affecting properties of, 10: 2435

## Zirconium (liquid)

reactions with  $H_2O$  under high pressures, 10: 847

## Zirconium alloys

chemical analysis for Zr, 10: 1236

corrosion by 600 and 680°F water and steam, 10: 2077

corrosion by steam, effects of temperature and pressure on, 10: 2077

corrosion in 500 and 600°F water, 10: 1806

corrosion in hot  $H_2O$ , 10: 859(R)

explosions in pickling and etching, 10: 3615

fabrication and mechanical properties, 10: 3013(R)

phase studies, 10: 2070

superconductivity, transition temperatures for, 10: 900(J)

thermal conductivity measurement over temperature range 50 to 400°C, 10: 3366

vacuum induction-melted, 10: 1833(J)

## Zirconium-aluminum alloys

electrodeposition from hydride-borohydride type baths, 10: 862(R)

tensile properties for temperature range -195 to 500°C, 10: 188(R)

## Zirconium-aluminum-nickel alloys

preparation and properties, 10: 1391



- Zirconium--aluminum--silicon systems  
tensile properties of low-impurity, 10: 188(R)
- Zirconium--aluminum--tin alloys  
corrosion by water, 10: 858(R)
- Zirconium borides  
bonding, 10: 2700
- Zirconium borohydrides  
preparation, 10: 862(R)
- Zirconium carbide--titanium carbide--vanadium carbide systems  
physical properties, 10: 788
- Zirconium carbides  
heats of formation and combustion, 10: 2623(J)  
preparation and chemical analysis, 10: 3590
- Zirconium chloride--potassium chloride--sodium chloride systems  
phase studies, 10: 578
- Zirconium chloride--potassium chloride systems  
phase studies, 10: 578
- Zirconium chloride--sodium chloride systems  
electrical conductivity and phase studies, 10: 578
- Zirconium chlorides  
manufacturing processes in Auer plant, Berlin, 10: 145  
purification, 10: 858(R)  
reduction by a hydrogen glow discharge, 10: 1816  
vapor pressure of, from NaCl - ZrCl<sub>4</sub> and KCl - ZrCl<sub>4</sub> systems, 10: 578
- Zirconium(IV) chlorides  
production by chlorination of Zr, 10: 1215(R)
- Zirconium compacts  
extrusion, 10: 3613  
fabrication of, in graphite molds, 10: 3008
- Zirconium complexes  
properties, 10: 2268
- Zirconium--copper alloys  
tensile properties, 10: 1804
- Zirconium fluorides  
conversion to oxide, design of ball kiln for, 10: 3143(R)  
crystal form and lattice space, 10: 86(J)  
preparation, 10: 3197  
preparation of ZrF<sub>4</sub> by conversion of zirconium sulfates, 10: 634  
properties, x-ray studies of, 10: 3657  
vapor pressure and boiling point, 10: 3336
- Zirconium--hafnium alloys  
tensile properties, 10: 1804
- Zirconium hydrides  
decomposition and analysis for B, 10: 2736  
dissociation pressures and solvent properties, 10: 2258(R)  
powder metallurgy, 10: 2447  
spectrographic analysis for Al, 10: 610
- Zirconium iodides  
preparation from the carbonitride, 10: 1652(P)
- Zirconium ions  
self-consistent field for Z<sup>4+</sup>, 10: 1492(J)
- Zirconium--iron alloys  
corrosion, effect of microstructure on, 10: 858(R)  
corrosion in hot H<sub>2</sub>O, effect of microstructure on, 10: 859(R)
- Zirconium isotopes  
carrier-free, separation from mixed fission products, 10: 1288(R)  
separation procedures, 10: 2470
- Zirconium isotopes Zr<sup>90</sup>  
decay of metastable, and neutron reactions (n,n'), 10: 320(R)  
neutron reaction (n,α), cross section measurement, 10: 365(J)
- Zirconium isotopes Zr<sup>91</sup>  
nuclear moments, 10: 2156(J)
- Zirconium isotopes Zr<sup>93</sup>  
neutron absorption cross sections, 10: 320(R)  
separation from liquid metal fuel solutions, 10: 2328
- Zirconium isotopes Zr<sup>94</sup>  
neutron reaction (n,α), cross section measurement, 10: 365(J)
- Zirconium isotopes Zr<sup>98</sup>  
radioactivity, 10: 1601
- Zirconium isotopes Zr<sup>97</sup>  
formation cross section from deuteron bombardment of U, 10: 2239(J)  
formation cross sections of, from U<sup>238</sup> bombarded with 19- to 190-Mev deuterons, 10: 2237
- Zirconium--molybdenum alloys  
analysis, heat treatment, and crystal structure, 10: 1370(R)  
surface properties of, studied with a field emission microscope, 10: 852
- Zirconium--molybdenum--tin alloys  
mechanical properties, effect of heat treatment on, preparation, 10: 833
- Zirconium--niobium alloys  
heat treatment and phase studies, 10: 1370(R)  
tensile properties, 10: 1804
- Zirconium--niobium--uranium alloys  
explosions in pickling and etching, 10: 3615
- Zirconium nitrides  
preparation, 10: 2250(R)  
preparation by reaction of ZrCl<sub>4</sub> with NH<sub>3</sub>, 10: 2251(R)
- Zirconium--nitrogen systems  
kinetics in temperature range of 920 to 1640°C, 10: 3195
- Zirconium--nitrogen--tin systems  
kinetics in temperature range of 920 to 1640°C, 10: 3195
- Zirconium oxide--aluminum oxide systems  
thermal conductivity measurement, 10: 1342(R)
- Zirconium oxide--calcium oxide systems  
solid solutions in mechanism of formation, 10: 75(J)
- Zirconium oxide electrodes  
copper plated, high frequency vacuum breakdown tests, 10: 2458
- Zirconium oxide films  
preparation, porosity, and thickness measurements, 10: 561
- Zirconium oxides  
chemical analysis for Zr, 10: 1236  
decomposition and analysis for B, 10: 2736  
equilibrium studies at high temperatures, 10: 1343(J)  
high-temperature properties and applications, 10: 1345(J)  
manufacturing processes in Auer plant, Berlin, 10: 145  
preparation and purification, 10: 3274
- Zirconium--oxygen systems  
tensile properties, 10: 1804

## Zirconium powders

- metallurgical properties, 10: 2447
- metallurgy and properties of, 10: 1828(J)

## Zirconium silicates

- x-ray-diffraction analysis of irradiated, 10: 3035(R)

## Zirconium silicides

- preparation, physical properties, and analysis, 10: 2738(J)

## Zirconium-silicon systems

- tensile properties of low-impurity, 10: 188(R)

## Zirconium sulfates

- fluorination, 10: 634
- precipitation for production of pure Zr, 10: 3262

## Zirconium-tantalum alloys

- electric and thermal conductivity, 10: 2437
- heat treatment and phase studies, 10: 1370(R)
- phase studies, 10: 3196(R)
- tensile properties, 10: 1804

## Zirconium thiocyanates

- separation by solvent extraction, 10: 2995

## Zirconium-thorium alloys

- phase studies, 10: 3196(R)

## Zirconium-tin alloys

- alloying behavior with Cu-base alloys at extrusion temperature, 10: 2436
- analysis, heat treatment, and crystal structure, 10: 1370(R)
- analysis for Sn in, microtechnique, 10: 613
- bend tests, equipment for, 10: 3360
- corrosion by Dowtherm A-alkylbenzene mixtures, 10: 3005
- corrosion by water, effect of O and F on, 10: 858(R)
- corrosion in hot H<sub>2</sub>O, effects of Al impurities and microstructure on, 10: 859(R)
- corrosion in 600°F H<sub>2</sub>O, 10: 2703
- corrosion in H<sub>2</sub>O below 600°F, 10: 3611
- creep and tensile properties, 10: 3010
- development and production of heavy-walled back-extruded Zircaloy-2 cups, 10: 1822
- ductility, effect of H on, 10: 3015
- effect of fast neutrons on, 10: 2194
- electric and thermal conductivity, 10: 2437
- electroplating of Al, Cr, and Ni on, 10: 3358
- fabrication, 10: 2441
- hydrogenation and effects of radiation, 10: 2718
- phase studies and thermal analysis, 10: 3332
- physical and mechanical properties, 10: 3604
- production by consumable-electrode arc melting, 10: 3284
- recrystallization, deformation, and grain growth characteristics, 10: 1815
- tensile properties, 10: 1804
- thermal conductivity, 10: 3616
- thermal conductivity measurement over temperature range 50 to 400°C, 10: 3366

## Zirconium-tin alloys (liquid)

- reactions with H<sub>2</sub>O, 10: 560

## Zirconium-tin-uranium alloys

- analysis for Sn in, microtechnique, 10: 613

## Zirconium-titanium alloys

- analysis, heat treatment, and crystal structure, 10: 1370(R)

## Zirconium-titanium alloys (cont'd)

- corrosion-erosion of, 10: 1347
- corrosion in hot H<sub>2</sub>O, effect of microstructure on, 10: 859(R)

## Zirconium-titanium-uranium alloys

- spectrophotometric analysis for uranium, 10: 1233

## Zirconium-tungsten alloys

- tensile properties, 10: 1804

## Zirconium-uranium alloys

- creep and tensile properties at 500°F, 10: 831
- electric and thermal conductivity, 10: 2437
- etching in HNO<sub>3</sub> baths, explosive properties, 10: 1766
- explosions in pickling and etching, 10: 3615
- explosive reactions with nitric acid during etching, 10: 3526
- hardness survey at temperatures from room temperature to 900°C, 10: 3359
- thermal conductivity, 10: 3616

## Zirconium-water systems

- spatial distribution of Po-Be thermal neutrons in, 10: 431(J)

## Zircons

- analysis of, 10: 858(R)
- conversion into metamict state, 10: 3131(J)

## Zirconyl phosphates

- preparation of colloidal, containing P<sup>32</sup>, 10: 650(J)

## Zuni Uplift (N. Mex.)

- uranium deposits and color changes, 10: 799

# NUMERICAL INDEX OF REPORTS

Numerical Index of Official Atomic Energy Reports with Indications of Their Availability.

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For each reference the number preceding the dash is the volume number, and the numbers following are the abstract numbers.

In addition to the report number and corresponding abstract number, the index includes a brief statement regarding the availability of each AEC report listed; no special efforts were made to determine the availability of non-AEC items, but such information is included when known. For further information regarding the availability of these reports, consult the Introduction to this index.

*Nuclear Science Abstracts*, Vol. 7, No. 24A, Dec. 31, 1953, includes a cumulated Numerical Index of Reports covering all reports in *Abstracts of Declassified Documents (ADD)* and in NSA, Vols. 1–7, together with the latest availability information as of Dec. 31, 1953. Information concerning reports abstracted in NSA, Vols. 8 and 9 appears in issue No. 24A of the respective volumes which are dated Dec. 31, 1954 and Dec. 31, 1955. A completely cumulated listing covering all volumes of ADD and NSA through Vol. 9 is issued as a separate publication, TID-4000 (2nd Edition). Each issue of NSA, Vol. 9 (1955) and Vol. 10 (1956), contains information concerning reports abstracted in that issue. All current information is cumulated for the first half of the year in issue No. 12B, and a complete annual cumulation is published as issue No. 24A. In addition, each issue contains new information concerning the availability of reports previously abstracted.

In order to help identify the originator of each series of non-AEC reports, a significant word has been placed in parentheses beside the code. No parenthetical word is shown for series of reports issued by the USAEC. Information regarding the location and acquisition of non-AEC reports appears in the Introduction to this issue.

The Introduction to this issue also contains location and acquisition information to supplement the following explanations of the various types of entries found in the "Availability" column:

**NSA**  
Nuclear Science Abstracts.

**ADD**  
Abstracts of Declassified Documents, the predecessor of NSA.

**NNES**  
National Nuclear Energy Series, published by the McGraw-Hill Book Co.

**Sale Price (OTS)**  
USAEC report, available from the Office of Technical Services.

**Sale Price (GPO)**  
USAEC or other report for sale through the U. S. Government Printing Office.

**Sale Price (ph OTS or mf OTS)**  
Available from the Office of Technical Services, Department of Commerce, Washington 25, D. C., in photostat (ph) or microfilm (mf) form.

**Sale Price**  
If British report, available from British Information Services. If Canadian report, available from Atomic Energy of Canada Ltd.

**In.....**  
Reports contained in published books.

**Reference (Condensed)**  
Thesis published in condensed form.

**Dep.**  
USAEC reports available at the All Depository Libraries as full-size copy for consultation or for sale as photocopies.

**Dep.(mc)**  
USAEC reports available at the All Depository Libraries only in microcard form. Full-size copies of such reports can be obtained on a loan basis by any All Depository Library on request to the Technical Information Extension.

**TCL**  
On deposit at the SLA Translation Pool. For information concerning the price of photocopies, inquire of the following address: John Crerar Library, Chicago 1, Illinois, Attn.: SLA Translation Pool.

**LC**  
On deposit at the Scientific Translation Center. For information concerning the price of photocopies, inquire of the following address: Library of Congress, Washington 25, D. C. Attn.: Scientific Translation Center.

**Dep.(mc); Ind. Dep.**  
A report held by the other All Depository Libraries in microcard form only is available in full-size copies at the Industrial Depository Libraries.

**Journal (without citation)**  
Report has been submitted to the journal for publication.

**Journal (with specific citation)**  
Report has been published as cited.

**USGS**  
Available from the U. S. Geological Survey, Washington 25, D. C.

**NRC**  
Available from National Research Council of Canada, Ottawa, Ontario, Canada.

**JENER**  
Available from the Librarian, Joint Establishment for Nuclear Energy Research, Kjeller per Lillerstrom, Norway.

## ASSIGNED CODE DESIGNATIONS

**MDDC**  
To declassified reports released by the Manhattan Engineer District and by the Atomic Energy Commission before March 1, 1948.

**AECD**  
To declassified reports released by the Atomic Energy Commission after February 29, 1948 (appeared in April 15, *Nuclear Science Abstracts*).

**AECU**  
To unclassified reports originating within the Atomic Energy Project. (Subsequent to AECU-871, this code is applied only to reports carrying no other recognized code designation.)

**NP**  
A file designation assigned by the Technical Information Extension (TIE) to nonproject reports whose codes, if present, are not practical for TIE use.

Other code designations are assigned to unclassified reports by the originating installations.



# NUMERICAL INDEX OF REPORTS

## PART I

Report	Abstract	Availability	Report	Abstract	Availability
Numerical (Misc.)			A		
1DR-3	10-2448	See A-502	728	10-3511	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1DR-28	10-2358	See A-538	731	10-2361	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1-R128	10-2362	See A-732	732	10-2362	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2CR-135	10-2471	See A-750	740	10-3465	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
2R-238	10-3462	See A-754	748	10-2309	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
2R-328	10-2359	See A-708	750	10-2471	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)
100B-R-140	10-2249	See A-1268	754	10-3452	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
100B-R-199	10-2342	See A-2108	777	10-2363	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
100B-R-243	10-3420	See A-2157	796	10-3498	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
100B-R-244	10-3421	See A-2158	888	10-2310	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
100K-R-654	10-3516	See A-1277	988	10-3553	See CN-795
100RD-152	10-3519	See A-3387	1000	10-3512	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
100XR-150	10-3510	See A-523	1025	10-3513	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
100XR-158	10-3498	See A-796	1038	10-3514	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
100XR-1200	10-2360	See A-726	1072	10-3751	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
100XR-1218	10-3511	See A-728	1076	10-3419	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
100XR-1219	10-2361	See A-731	1083	10-3515	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
100XR-1353	10-3466	See A-740	1185	10-2441	See CT-890
100XR-1466	10-2309	See A-748	1205	10-2249	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
A			1268(Suppl.)	10-2342	See A-2108
4.390.31	10-3753	See AECD-3874	1277	10-3516	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
7.390.20	10-3754	See AECD-3909	1315	10-3713	See CT-883
28	10-3511	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1432	10-3416	See CL-1039
30	10-3509	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1448	10-2379	See CN-1060
36	10-2355	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1481	10-2522	See CE-1074
40	10-2565	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	1507	10-2341	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
99	10-2356	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1511	10-2269	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
146	10-2468	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1539	10-3683	See CE-1132
149	10-2306	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1615	10-3684	See CE-1149
230	10-3680	See C-192	1636	10-3685	See CE-1150
295	10-3402	See CC-264	1874	10-3460	See CC-1321
381	10-3584	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1899	10-3709	See CP-1350
387	10-3757	See CF-338	2004	10-3501	See CK-1359
419	10-3471	See CE-364	2010	10-2377	See CC-1386
456	10-2357	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2024	10-3681	See CC-1383
502	10-2448	Superseded by J. Am. Chem. Soc. 69, 2105-7 (1947)	2043	10-3710	See CP-1456
523	10-3510	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	2106	10-3412	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
538	10-3358	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	2157	10-3420	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
664	10-2397	See CN-527	2158	10-3421	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
708	10-3159	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	2207	10-3502	See CK-1529
726	10-2360	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2219	10-3608	See CT-1571
			2254	10-3758	See CP-1589

Report	Abstract	Availability	Report	Abstract	Availability
A			A		
2260	10-3759	See CP-1598	4062	10-2372	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
2263	10-2285	See CC-1432	4064	10-2373	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
2314	10-2364	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	4065	10-2374	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2321	10-2365	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	4174	10-2276	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2412	10-3736	See CP-1876	4254	10-2402	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
2431	10-3504	See CN-1702	4257	10-2507	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
2437	10-3503	See CK-1712			
2443	10-3658	See CP-1729	ACCO		
2445	10-3760	See CP-1732	1	10-660	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
2553	10-3466	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	5	10-661	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
2588	10-2311	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	8	10-2980	Dep.; \$0.20(OTS)
2644	10-3748	See CP-1818	19	10-3111	Dep.; \$0.30(OTS)
2661	10-3608	See CP-1837	25	10-2658	Dep.; \$0.20(OTS)
2663	10-3715	See CT-1897	27	10-2981	Dep.; \$0.25(OTS)
2702	10-3517	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	29	10-2659	Dep.; \$0.20(OTS)
2703	10-2366	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	30	10-742	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
2705	10-2387	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	31	10-2677	Dep.; \$0.15(OTS)
2709	10-3518	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	32	10-2982	Dep.; \$0.25(OTS)
2710	10-2324	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	33	10-662	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
2711	10-2270	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	35	10-2983	Dep.; \$0.25(OTS)
2712	10-2271	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	36	10-2984	Dep.; \$0.25(OTS)
2714	10-2368	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	38	10-663	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
2903	10-2272	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	38(Suppl.)	10-2043	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2940	10-3422	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	40	10-2985	Dep.; \$0.30(OTS)
2950	10-3601	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	42	10-2660	Dep.; \$0.20(OTS)
3011	10-2456	See CN-2069	46	10-3117	Dep.; \$0.40(OTS)
3143	10-2369	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	48	10-3118	Dep.; \$0.25(OTS)
3226	10-2370	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	50	10-664	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
3254	10-2371	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	51	10-665	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3387	10-3519	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	52	10-2661	Dep.; \$0.20(OTS)
3502	10-3423	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	53	10-2986	Dep.; \$0.25(OTS)
3505	10-3520	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	55	10-2678	Dep.; \$0.15(OTS)
3506	10-3521	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	56	10-1286	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
3507	10-3522	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	57	10-666	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
3511	10-2325	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	58	10-667	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
3513	10-2312	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)	59	10-3119	Dep.; \$0.20(OTS)
3550	10-3523	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	60	10-3049	Dep.; \$0.25(OTS)
3552	10-2313	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	61	10-2987	Dep.; \$0.25(OTS)
3554	10-3524	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)			
3747	10-2314	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	ACRH		
3784	10-2400	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	4	10-3167	Dep.; \$16.80(ph OTS); \$5.70(mf OTS)
3904	10-2250	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	AEC-tr		
3905	10-2251	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	2156	10-3766	Dep.; \$0.60(OTS)
3947	10-2566	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2230	10-549	JCL
3954	10-3463	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2232	10-868	LC
3957	10-3624	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	2254	10-1131	Associated Technical Services (Trans. 55G6R), East Orange, N. J.
3962	10-2343	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2260	10-869	LC
4017	10-2273	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2266	10-980	LC
4018	10-3424	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2267	10-1588	LC
4022	10-2274	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	2268	10-1589	LC
4024	10-3525	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2273	10-5	JCL
4028	10-2275	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2274	10-6	JCL
4045	10-822	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	2275	10-510	JCL
4047	10-3741	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)			

Report	Abstract	Availability	Report	Abstract	Availability
AEC-tr			AEC-tr		
2276	10-7	JCL	2325	10-897	Associated Technical Services (Trans. 02G7R), East Orange, N. J.
2277	10-870	LC	2326	10-897	
2278	10-308	Associated Technical Services (Trans. 06G7R), East Orange, N. J.	2327	10-1155	JCL
2279	10-229	Associated Technical Services (Trans. 04G7R), East Orange, N. J.	2328	10-588	LC
2283	10-224	Columbia Technical Translation (CL-13535, Item A), White Plains, N. Y.	2329	10-1413	Associated Technical Services (Trans. 69G7R), East Orange, N. J.
2284	10-225	Columbia Technical Translation (CL-13535, Item B), White Plains, N. Y.	2330	10-1414	Associated Technical Services (Trans. 70G7R), East Orange, N. J.
2285	10-108	JCL	2331	10-958	Available from Associated Technical Services (Trans. 49G7R), East Orange, N. J.
2286	10-485	JCL	2332	10-1620	Associated Technical Services (Trans. 03G7R), East Orange, N. J.
2287	10-86	JCL	2333	10-914	Available from Associated Technical Services (Trans. 05G7R), East Orange, N. J.
2288	10-321	JCL	2334	10-1415	Associated Technical Services (Trans. No. 87G6R), East Orange, N. J.
2289	10-1017	Consultants Bureau (Collection No. 4 of Soviet Research in High Energy Fission), New York	2335	10-1431	Associated Technical Services (Trans. No. 94G7G), East Orange, N. J.
2290	10-550	JCL	2336	10-1643	JCL
2291	10-551	JCL	2339	10-1644	JCL
2292	10-491	Associated Technical Services (Trans. 01G7R), East Orange, N. J.	2340	10-1645	JCL
2293	10-204	Associated Technical Services (Trans. 59G6R), East Orange, N. J.	2341	10-1646	JCL
2294	10-272	LC	2342	10-1647	JCL
2295	10-333	LC	2344	10-1348	JCL
2296	10-499	LC	2345	10-1648	JCL
2297	10-1119	LC	2347	10-1824	LC
2298	10-308	Associated Technical Services (Trans. 68G7R), East Orange, N. J.	2348	10-1255	LC
2299	10-226	Associated Technical Services (Trans. 53G6R), East Orange, N. J.	2349	10-1416	Associated Technical Services (Trans. 62G7R), East Orange, N. J.
2300	10-309	Associated Technical Services (Trans. 71G7R), East Orange, N. J.	2350	10-1460	Associated Technical Services (Trans. 27G7R), East Orange, N. J.
2301	10-1120	LC	2351	10-1444	Associated Technical Services (Trans. 94G6R), East Orange, N. J.
2302	10-273	LC	2352	10-1243	
2303	10-274	LC	2353	10-1257	
2304	10-275	LC	2354	10-1324	JCL
2305	10-1068	Consultants Bureau, New York	2355	10-1962	LC
2306	10-1069	Consultants Bureau, New York	2356	10-1864	JCL
2307	10-1070	Consultants Bureau (Collection No. 4 of Soviet Research in High Energy Fission), New York	2357	10-1841	Associated Technical Services (Trans. 97G7R), East Orange, N. J.
2308	10-1071	Consultants Bureau (Collection No. 4 of Soviet Research in High Energy Fission), New York	2358	10-1945	Associated Technical Services (Trans. 83G7R), East Orange, N. J.
2309	10-1121	LC	2359	10-1940	Associated Technical Services (Trans. 93G6R), East Orange, N. J.
2310	10-997	LC	2360	10-1731	JCL
2311	10-1102	LC	2361	10-1768	JCL
2312	10-1103	LC	2362	10-2971	LC
2313	10-871	JCL	2363	10-2238	LC
2314	10-765	JCL	2364	10-2060	Associated Technical Services, (Trans. 08G7G), East Orange, N. J.
2315	10-939	JCL	2365	10-2085	Associated Technical Services (Trans. 95G7G), East Orange, N. J.
2316	10-902	LC	2366	10-2086	Associated Technical Services (Trans. 96G7G), East Orange, N. J.
2317	10-766	LC	2367	10-2016	Associated Technical Services (Trans. 45G8R), East Orange, N. J.
2318	10-872	LC			
2319	10-930	LC			
2320	10-913	Associated Technical Services (Trans. 00G6R), East Orange, N. J.			
2324	10-895	Associated Technical Services (Trans. 61G6R), East Orange, N. J.			



Report	Abstract	Availability	Report	Abstract	Availability
AEC-tr			AEC-tr		
2368	10-2605	JCL	2432	10-3364	LC
2369	10-2770	Associated Technical Services (Trans. 84G7R), East Orange, N. J.	2433	10-3829	JCL
2370	10-2869	Associated Technical Services (Trans. 36G8R), East Orange, N. J.	2434	10-3835	JCL
2371	10-2848	LC	2438	10-3802	JCL
2372	10-3019	LC	2440	10-3830	JCL
2373	10-3017	JCL	2441	10-3808	JCL
2374	10-3051	JCL	2442	10-3822	JCL
2375	10-2705	JCL	2444	10-3803	JCL
2376	10-2618	JCL	2445	10-3823	JCL
2377	10-2737	JCL	2448	10-3832	LC
2379	10-2706	JCL	2450	10-3781	JCL
2380	10-2901	LC	2460	10-3840	Associated Technical Services(Trans-26H9G), East Orange, N. J.
2382	10-3223	LC	AECD		
2383	10-3242	LC	3634	10-3127	Dep.; \$0.25(OTS)
2384	10-3131	LC	3650	10-884	Dep.; \$0.15(OTS)
2385	10-3094	JCL	3651	10-757	Dep.; \$0.20(OTS)
2386	10-3238	LC	3653	10-1085	Dep.; \$0.30(OTS)
2387	10-3152	Associated Technical Services (Trans. 82H8R), East Orange, New Jersey	3655	10-1013	Phys. Rev. 102, 823-30(1956) (Condensed)
2388	10-3326	JCL	3656	10-373	Dep.; \$0.20 (OTS)
2389	10-3170	LC	3661	10-3030	Dep.; \$0.40(OTS)
2391	10-3138	Associated Technical Services (Trans. 83H8R), East Orange, New Jersey	3662	10-604	Dep.; \$0.15(OTS)
2393	10-3296	JCL	3663	10-1636	Dep.; \$0.30(OTS)
2394	10-3302	JCL	3664	10-560	Dep.; \$0.40(OTS)
2395	10-3224	Associated Technical Services (Trans. 93H8R), East Orange, N. J.	3665	10-1803	Dep.; \$0.20(OTS)
2396	10-3171	JCL	3666	10-1544	Dep.; \$0.50(OTS)
2398	10-3245	JCL	3668	10-1921	Dep.; \$0.45(OTS)
2399	10-3214	JCL	3670	10-1545	Dep.; \$0.15(OTS)
2400	10-3261	JCL	3671	10-1315	Dep.; \$0.15(OTS)
2401	10-3263	JCL	3672	10-1765	Dep.; \$0.15(OTS)
2402	10-3294	JCL	3673	10-2070	Dep.; \$0.35(OTS)
2404	10-3191	JCL	3674	10-1230	Superseded by LA-1721(Rev.)
2405	10-3306	LC	3675	10-1546	Dep.; \$0.30(OTS)
2406	10-3172	LC	3677	10-1922	Dep.; \$0.55(OTS)
2407	10-3178	JCL	3678	10-1027	Dep.(mc); \$63.00(ph OTS); \$11.10(mf OTS)
2409	10-3247	Associated Technical Services (Trans. 21H9R), East Orange, N. J.	3679	10-2021	Dep.; \$0.45(OTS)
2411	10-3778	JCL	3680	10-1804	Dep.; \$0.40(OTS)
2414	10-3208	JCL	3681	10-2161	Dep.; \$0.35(OTS)
2415	10-3297	Lawyers & Merchants Translation Bureau, New York	3682	10-2162	Dep.; \$0.45(OTS)
2420	10-3264	Associated Technical Services (Trans. No. 41H9G), East Orange, N. J.	3683	10-117	Dep.(mc); \$3.30 (ph OTS); \$2.40 (mf OTS)
2421	10-3782	LC	3684	10-11	Dep.(mc); \$10.80 (ph OTS); \$3.90 (mf OTS)
2422	10-3783	LC	3685	10-12	Dep.(mc); \$12.30 (ph OTS); \$4.50 (mf OTS)
2423	10-3827	JCL	3686	10-13	Dep.(mc); \$10.80 (ph OTS); \$3.90 (mf OTS)
2424	10-3828	JCL	3688	10-829	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2426	10-3371	JCL	3691	10-2142	Dep.; \$0.30(OTS)
2427	10-3265	JCL	3693	10-3008	Dep.; \$0.30(OTS)
2428	10-3831	JCL	3694	10-668	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)
2429	10-3370	JCL	3695	10-546	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)
2430	10-3269	LC	3696	10-2071	Dep.; \$0.20(OTS)
2431	10-3849	JCL	3698	10-1316	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
			3699	10-3855	Dep.; \$0.20(OTS)
			3700	10-2988	Dep.; \$0.30(OTS)
			3701	10-2879	Dep.; \$0.30(OTS)
			3702	10-3129	Dep.; \$0.15(OTS)

Report	Abstract	Availability	Report	Abstract	Availability
AFCD			AECD		
3703	10-3120	Dep.; \$0.35(OTS)	3841	10-2557	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
3704	10-2702	Dep.; \$0.35(OTS)	3842	10-2548	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
3705	10-3335	Dep.; \$0.35(OTS)	3845	10-2282	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3706	10-3824	Dep.; \$0.40(OTS)	3846	10-3649	Dep.(mc); \$16.80(ph OTS); \$5.70(mf OTS)
3707	10-3856	Dep.; \$0.30(OTS)	3847	10-3589	Dep.(mc); \$3.00(ph OTS); \$2.40(mf OTS)
3708	10-3336	Dep.; \$0.15(OTS)	3848	10-3642	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3709	10-3857	Dep.; \$0.20(OTS)	3849	10-3643	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3710	10-1231	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3850	10-3425	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3711	10-3858	Dep.; \$0.15(OTS)	3851	10-3526	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3713	10-3796	Dep.; \$0.20(OTS)	3854	10-3527	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3714	10-1188	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3855	10-3752	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3715	10-3381	Dep.; \$0.15(OTS)	3859	10-3481	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3716	10-3382	Dep.; \$0.25(OTS)	3862	10-3672	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3717	10-3805	Dep.; \$0.25(OTS)	3864	10-3616	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3718	10-3218	Dep.; \$0.15(OTS)	3865	10-3474	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
3719	10-3383	Dep.; \$0.20(OTS)	3867	10-3528	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3720	10-3859	Dep.; \$0.15(OTS)	3868	10-3673	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3721	10-3860	Dep.; \$0.15(OTS)	3874	10-3753	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3724	10-3310	Dep.; \$0.20(OTS)	3875	10-3529	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3726	10-2797	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3891	10-3602	Dep.(mc); \$16.80(ph OTS); \$5.70(mf OTS)
3727	10-2978	Dep.; \$0.15(OTS)	3896	10-3592	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3728	10-3254	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3897	10-3530	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3734	10-3288	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	3901	10-3581	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
3735	10-3806	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3908	10-3603	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)
3736	10-3833	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3909	10-3482	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
3777	10-2252	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3908	10-3531	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3787	10-3634	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3909	10-3754	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3789	10-2449	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	3910	10-3532	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
3790	10-2277	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	3911	10-3533	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
3791	10-2494	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	3916	10-3604	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
3792	10-2495	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	3917	10-3534	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3793	10-2253	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	3924	10-2508	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3799	10-2469	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3927	10-2256	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
3800	10-2434	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3930	10-3738	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
3801	10-2375	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3931	10-3733	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3803	10-2435	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3932	10-3674	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3805	10-2376	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3937	10-3535	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3807	10-3478	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	3937	10-3536	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3808	10-2244	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3941	10-3537	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3809	10-2326	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	3945	10-3734	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3810	10-3479	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)	3947	10-3538	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3811	10-2278	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	3949	10-3605	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)
3812	10-2403	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)	3951	10-3590	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3813	10-2462	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	3952	10-3540	Dep.(mc); \$3.50(ph OTS); \$2.40(mf OTS)
3814	10-2254	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3953	10-3541	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3817	10-2242	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	3954	10-3542	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3825	10-2279	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3955	10-3543	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3826	10-2255	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	3956	10-3544	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
3827	10-2436	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3957	10-3545	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3828	10-2280	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3958	10-3546	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3829	10-2470	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)	3959	10-3619	Dep.(mc); \$13.80(ph OTS); \$4.80(mf OTS)
3830	10-2281	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3971	10-3675	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
			3974	10-3742	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)

Report	Abstract	Availability	Report	Abstract	Availability
AECD			AECU		
3989	10-3676	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3113	10-3101	Dep.; \$0.50(OTS)
3991	10-3426	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3115	10-1327	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)
3994	10-3665	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3116	10-1208	Dep.; \$13.80(ph OTS); \$4.80(mf OTS)
AECU			3117	10-1202	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
2924	10-319	Dep.; \$0.10 (OTS)	3119	10-1778	Dep.(mc); \$13.80(ph OTS); \$4.80(mf OTS)
2979	10-125	Dep.; \$0.15 (OTS)	3120	10-1805	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3031	10-3311	Dep.; \$1.25(OTS)	3121	10-1903	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)
3037	10-758	Dep.; \$0.20(OTS)	3122	10-2226	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
3039	10-50	Dep.; \$0.15 (OTS)	3125	10-1836	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3043	10-512	Dep.; \$0.25(OTS)	3127	10-2127	Dep.(mc); \$28.80(ph OTS); \$8.40(mf OTS)
3046	10-406	Dep.; \$12.30 (ph OTS); \$4.50 (mf OTS)	3130	10-2574	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3050	10-14	Dep.; \$0.25 (OTS)	3131	10-2625	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
3058	10-561	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)	3132	10-2005	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
3062	10-2163	Dep.; \$1.75(OTS)	3133	10-2575	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
3064	10-1720	Dep.; \$1.00(OTS)	3134	10-2576	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
3071	10-1287	Dep.; \$0.30(OTS)	3135	10-2006	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3076	10-1331	Dep.; \$0.25(OTS)	3136	10-2883	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
3077	10-2025	Dep.; \$0.65(OTS)	3139	10-3767	Dep.; \$1.00(OTS)
3078	10-1868	Dep.; \$0.60(OTS)	3140	10-2969	Dep.; \$15.30(ph OTS); \$5.40(mf OTS)
3079	10-1718	Dep.; \$0.35(OTS)	3141	10-2964	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
3081	10-885	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)	3142	10-2648	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3082	10-886	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	3145	10-3044	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3083	10-735	Ind. Eng. Chem. 47, 2536-9(1955)	3147	10-3153	Phys. Rev. 102, 486-8(1956)
3084	10-562	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3155	10-3201	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3085	10-741	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3156	10-3202	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3086	10-993	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3157	10-3298	Dep.; \$10.80(ph OTS); \$3.90(mf OTS)
3087	10-146	J. Electrochem. Soc. 103, 64-72(1956)	3158	10-3291	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)
3088	10-994	J. Chem. Phys. 23, 2105-7(1955)	3162	10-3270	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3089	10-483	Dep.(mc); \$4.80 (ph OTS); \$2.70 (mf OTS)	3163	10-3309	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3090	10-231	Dep.(mc); \$3.30 (ph OTS); \$2.40 (mf OTS)	3165	10-3295	
3091	10-228	J. Chem. Phys. 23, 2045-9(1955)	3167	10-3280	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3092	10-307	J. Phys. Chem. 60, 498-9(1956)	3168	10-3281	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)
3093	10-200	J. Chem. Phys. 24, 124-30(1956)	3169	10-3250	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3094	10-487	Dep.(mc); \$1.80 (ph OTS); \$1.80 (mf OTS)	3173	10-3851	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
3095	10-632	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3179	10-3329	Dep.(mc); \$13.80(ph OTS); \$4.80(mf OTS)
3096	10-173	Dep.(mc); \$1.80 (ph OTS); \$1.80 (mf OTS)	AL		
3097	10-633	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	333	10-2316	See NAA-SR-4
3098	10-743	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	333	10-2317	See NAA-SR-10
3099	10-15	Dep.(mc); \$7.80 (ph OTS); \$3.30 (mf OTS)	ANL		
3100	10-535	Dep.; \$0.35(GPO)	4397	10-2496	Dep.(mc); \$16.80(ph OTS); \$5.70(mf OTS)
3101	10-2970	Dep.; \$0.30(OTS)	4077	10-3650	Dep.(mc); \$16.80(ph OTS); \$5.70(mf OTS)
3102	10-1438	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	4174	10-3651	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)
3103	10-909	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	4177	10-3591	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
3104	10-1014	Phys. Rev. 101, 1131-42(1956)	4181	10-3547	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3106	10-995	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)	4277	10-3652	Dep.(mc); \$16.80(ph OTS); \$5.70(mf OTS)
3107	10-941	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	4323	10-3653	Dep.(mc); \$13.80(ph OTS); \$4.80(mf OTS)
3108	10-1028	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	4350	10-3654	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)
3109	10-1160	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)	4400	10-3655	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)
3110	10-1506	Dep.(mc); \$31.80(ph OTS); \$9.30(mf OTS)	4400	10-3745	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3111	10-1129	Phys. Rev. 102, 331-40(1956)	4437	10-3677	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
3112	10-3021	Dep.; \$0.15(OTS)	4437	10-3656	Dep.(mc); \$19.80(ph OTS); \$6.30(mf OTS)



Report	Abstract	Availability	Report	Abstract	Availability
ANL			ANL-FF		
4475	10-3644	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	318G	10-878	J. Metals <u>7</u> , 1214-18(1955)
4483	10-2509	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	ANL-FGF		
4487	10-3676	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	2	10-1147	J. Metals <u>7</u> , 1206-14(1955)
4509	10-606	Dep.; \$0.25(OTS)	ANL-WMM		
4512	10-2510	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1140	10-3024	Dep.; \$0.15(OTS)
4596	10-2511	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	APEX		
4602	10-3657	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)	218	10-1993	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
4654	10-3499	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	238	10-3004	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
4743	10-2748	Dep.; \$0.40(OTS)	B		
4769	10-2283	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	6.460.11	10-3634	See AECD-3787
4801	10-3884	Dep.; \$0.20(OTS)	6.460.14	10-3531	See AECD-3908
4848	10-777	Dep.; \$0.25(OTS)	BC		
4912	10-1364	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	71	10-2345	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
4926	10-2556	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	BM-II		
4951	10-2512	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	96	10-3132	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
4994	10-2428	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	BM-RI		
5205	10-3784	Dep.; \$0.20(OTS)	5169	10-1807	Dep.(mc); Bureau of Mines
5206	10-3338	Dep.; \$0.15(OTS)	5200	10-3284	Dep.(mc); Bureau of Mines
5207	10-3339	Dep.; \$0.15(OTS)	5214	10-3262	Dep.(mc); Bureau of Mines
5240	10-3330	Dep.; \$0.70(OTS)	BMI		
5222	10-2567	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	65	10-2437	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
5224	10-1008	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)	66	10-3407	Dep.; \$0.15(OTS)
5354	10-1806	Dep.; \$1.00(OTS)	79	10-3809	Dep.; \$0.25(OTS)
5360	10-3193	Dep.; \$0.30(OTS)	97	10-2284	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
5361	10-2042	Dep.; \$0.15(OTS)	245	10-1209	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
5367	10-1637	Dep.; \$0.55(OTS)	261	10-3785	Dep.; \$0.25(OTS)
5370	10-3384	Dep.; \$0.60(OTS)	265	10-669	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
5387	10-353	Phys. Rev. <u>100</u> , 172-3(1955)	271	10-670	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
5409	10-3800	Dep.; \$0.35(OTS)	273	10-671	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
5412	10-1837	Dep.; \$12.30(ph OTS); \$4.50(mf OTS)	274	10-672	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
5431	10-374	Dep.; \$1.00 (OTS)	276	10-2999	Dep.; \$0.65(OTS)
5446	10-1992	Dep.; \$7.80(ph OTS); \$3.30(mf OTS)	277	10-673	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
5449	10-1365	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)	278	10-674	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
5472	10-3321	Dep.; \$0.75(OTS)	522	10-675	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
5480	10-330	Dep.; \$4.80 (ph OTS); \$2.70 (mf OTS)	550	10-2714	Dep.; \$0.20(OTS)
5486	10-1161	Dep.; \$16.80(ph OTS); \$5.70(mf OTS)	717	10-3000	Dep.; \$0.30(OTS)
5491	10-1029	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	718	10-3810	Dep.; \$0.15(OTS)
5499	10-3110	Dep.; \$1.00(OTS)	725	10-3811	Dep.; \$0.20(OTS)
5500	10-3355	Dep.; \$0.20(OTS)	728	10-3194	Dep.; \$0.15(OTS)
5501	10-3020	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	744	10-3009	Dep.; \$0.20(OTS)
5512	10-3289	Dep.; \$0.30(OTS)	745	10-3812	Dep.; \$0.30(OTS)
5513	10-3226	Dep.; \$0.25(OTS)	751	10-2438	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
5517	10-3028	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	753	10-3161	Dep.; \$0.15(OTS)
5518	10-3327	Dep.; \$1.00(OTS)	757	10-3813	Dep.; \$0.20(OTS)
5522	10-3352	Dep.; \$0.50(OTS)	766	10-3885	Dep.; \$0.20(OTS)
5523	10-3323	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	776	10-3358	Dep.; \$0.15(OTS)
5524	10-3365	Dep.; \$0.30(OTS)		10-2439	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
5525	10-3380	Dep.; \$15.30(ph OTS); \$5.40(mf OTS)		10-2715	Dep.; \$0.30(OTS)
5532	10-3861	Dep.; \$0.40(OTS)			
5545	10-3357	Dep.; \$0.20(OTS)			
5554	10-3862	Dep.; \$0.30(OTS)			

Report	Abstract	Availability	Report	Abstract	Availability
BAAI			BNL		
779	10-831	Dep.; \$0.15(OTS)	357	10-1030	Dep.; \$0.20(OTS)
781	10-1367	Dep.; \$0.20(OTS)	362	10-948	Dep.; \$0.10(OTS)
784	10-832	Dep.; \$0.25(OTS)	364	10-3387	Dep.; \$0.75(OTS)
793	10-2703	Dep.; \$0.25(OTS)	367	10-3143	Dep.; \$0.40(OTS)
818	10-3814	Dep.; \$0.20(OTS)	370	10-3154	Dep.; \$0.20(OTS)
819	10-3356	Dep.; \$0.15(OTS)	379	10-3373	Dep.; \$0.10(OTS)
829	10-3195	Dep.; \$0.25(OTS)	1149	10-3388	Dep.; \$0.20(OTS)
832	10-3010	Dep.; \$0.15(OTS)	1150	10-3865	Dep.; \$0.20(OTS)
833	10-3359	Dep.; \$0.15(OTS)	1151	10-3389	Dep.; \$0.15(OTS)
835	10-3815	Dep.; \$0.20(OTS)	1152	10-2515	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
849	10-3366	Dep.; \$0.15(OTS)	1328	10-3406	Dep.; \$0.45(OTS)
866	10-3816	Dep.; \$0.20(OTS)	1339	10-3390	Dep.; \$0.15(OTS)
870	10-2680	Dep.; \$0.15(OTS)	1365	10-2552	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
897	10-2681	Dep.; \$0.20(OTS)	1574	10-2489	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
900	10-2716	Dep.; \$0.15(OTS)	1577	10-2562	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
951	10-2056	Dep.; \$0.15(OTS)	1579	10-2516	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
957	10-1368	Dep.; \$0.25(OTS)	1602	10-2517	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
962	10-2022	Dep.; \$0.30(OTS)	1627	10-3038	Dep.; \$0.20(OTS)
978	10-55	Dep.(mc); \$6.30 (ph OTS); \$3.00 (mf OTS)	1690	10-3886	Dep.; \$0.15(OTS)
980	10-1143	Dep.; \$0.20(OTS)	1779	10-3039	Dep.; \$0.20(OTS)
987	10-933	Dep.; \$0.25(OTS)	1783	10-3227	Dep.; \$0.30(OTS)
997	10-887	Dep.; \$0.15(OTS)	1785	10-3391	Dep.; \$0.15(OTS)
1017	10-834	Dep.; \$0.20(OTS)	1796	10-3228	Dep.; \$0.25(OTS)
1028	10-2052	Dep.; \$0.35(OTS)	1798	10-2440	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1037	10-176	Dep.; \$7.80 (ph OTS); \$3.30 (mf OTS)	1812	10-3229	Dep.; \$0.15(OTS)
1041	10-2057	Dep.; \$0.20(OTS)	1814	10-2518	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1046	10-3005	Dep.; \$0.15(OTS)	1986	10-3145	Dep.; \$0.15(OTS)
1047	10-3006	Dep.; \$0.25(OTS)	1992	10-3866	Dep.; \$0.15(OTS)
1052	10-1369	Dep.; \$1.80(ph OTS); \$1.80(mf OTS).	2016	10-3392	Dep.; \$0.15(OTS)
1056	10-2072		2019	10-3393	Dep.; \$0.20(OTS)
1067	10-3121	Dep.; \$10.80(ph OTS); \$3.90(mf OTS)	2020	10-3867	Dep.; \$0.25(OTS)
BMI-JDC			2021	10-3394	Dep.; \$0.20(OTS)
202	10-3787	Dep.; \$0.30(OTS)	2022	10-3319	Dep.; \$0.20(OTS)
BMI-T			2023	10-3395	Dep.; \$0.15(OTS)
54	10-3385	Dep.; \$0.25(OTS)	2024	10-3396	Dep.; \$0.15(OTS)
55	10-3807	Dep.; \$0.25(OTS)	2025	10-3868	Dep.; \$0.15(OTS)
BNL			2026	10-3879	Dep.; \$0.20(OTS)
20	10-2513	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	2027	10-3397	Dep.; \$0.15(OTS)
22	10-2514	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	2028	10-3376	Dep.; \$0.20(OTS)
25	10-3033	Dep.; \$0.15(OTS)	2067	10-2606	Anat. Record <u>120</u> , 772-3(1954)
69	10-3469	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	2067A	10-51	J. Gen. Physiol. <u>39</u> , 31-53(1955)
86	10-3863	Dep.; \$0.25(OTS)	2108	10-52	J. Gen. Physiol. <u>39</u> , 55-67(1955)
123	10-3864	Dep.; \$0.25(OTS)	2119	10-315	J. Inorg. and Nuclear Chem. <u>1</u> , 253(1955)
130	10-3386	Dep.; \$0.30(OTS)	2158	10-3869	Dep.; \$0.30(OTS)
143	10-2306	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2164	10-3743	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
146	10-2307	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2172	10-1157	Growth <u>19</u> , 215-44(1955)
152	10-3037	Dep.; \$0.45(OTS)	2173	10-170	Nature <u>176</u> , 299-301(1955)
156	10-2308	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2174	10-1612	J. Chem. Phys. <u>23</u> , 2060-5(1955)
203	10-2053	Dep.; \$0.45(OTS)	2180	10-1613	J. Chem. Phys. <u>23</u> , 2066-8(1955)
350	10-3093	Dep.; \$1.25(OTS)	2183	10-2607	Exptl. Cell Research <u>9</u> , 474-88(1955)
354	10-1000	Dep.; \$0.15(OTS)	2184	10-644	Dep.; \$0.15(OTS)
355	10-1	Dep.; \$10.80 (ph OTS); \$3.90 (mf OTS)		10-3398	Dep.; \$0.15(OTS)

Report	Abstract	Availability	Report	Abstract	Availability
BNL			BNL		
2192	10-2111	J. Chem. Phys. <u>23</u> , 2264-7(1955)	2445	10-2151	Phys. Rev. <u>100</u> , 1338-9(1955)
2194	10-2174	Phys. Rev. <u>100</u> , 1302-8(1955)	2446	10-2054	Dep.; \$1.00(OTS)
2227	10-1834	Acta Met. <u>3</u> , 549-57(1955)	2450	10-3251	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)
2229	10-1463	Dep.; \$0.10(OTS)	2351	10-2640	Geochim. et Cosmochim. Acta <u>8</u> , 281-4 (1955)
2239	10-557	Exptl. Parasitol. <u>4</u> , 435-44(1955)	2449	10-3306	Phys. Rev. <u>101</u> , 388-97(1956)
2243	10-2653	J. Chem. Phys. <u>24</u> , 24-32(1956)	2453	10-519	Nucleonics <u>13</u> , No. 11, 128-9(1955)
2247	10-8	J. Immunol. <u>75</u> , 203-8(1955)	2457	10-2141	Phys. Rev. <u>100</u> , 1414-18(1955)
2259	10-2654	J. Chem. Phys. <u>24</u> , 56-9(1956)	2458	10-2202	Phys. Rev. <u>100</u> , 1357-63(1955)
2260	10-30	Radiation Research <u>3</u> , 116-20(1955)	2460	10-1634	Phys. Rev. <u>100</u> , 935-6(1955)
2265	10-2039	J. Chem. Phys. <u>23</u> , 2322-6(1955)	2465	10-2884	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
2266	10-1192	Nature <u>176</u> , 306(1955)	2477	10-2125	Rev. Sci. Instr. <u>26</u> , 1208-9(1955)
2271	10-2636	J. Biol. Chem. <u>217</u> , 61-6(1955)	2491	10-2122	Rev. Sci. Instr. <u>26</u> , 1201-2(1955)
2272	10-1195	Radiation Research <u>3</u> , 316-30(1955)	2501	10-1530	Phys. Rev. <u>100</u> , 943-4(1955)
2273	10-49	J. Pharmacol. Expt. Therap. <u>114</u> , 484-9 (1955)	2502	10-2843	Rev. Sci. Instr. <u>27</u> , 26-34(1956)
2274	10-1758	Nature <u>176</u> , 831(1955)	2503	10-2136	Phys. Rev. <u>100</u> , 1540-1(1955)
2285	10-1105	Nucleonics <u>13</u> , No. 11, 110-12(1955)	2522	10-2925	Phys. Rev. <u>100</u> , 1787-8(1955)
2295	10-2673	J. Bacteriol. <u>70</u> , 572-8(1955)	2503	10-3095	Dep.(mc); \$3.20(ph OTS); \$2.40(mf OTS)
2297	10-2652	J. Chem. Phys. <u>24</u> , 16-23(1956)	BP		
2306	10-1980	Am. J. Physiol. <u>183</u> , 125-36(1955)	13	10-3560	See M-2142
2309	10-1252	Anal. Chem. <u>27</u> , 1935-9(1955)	22	10-2311	See A-2588
2310	10-1253	Anal. Chem. <u>27</u> , 1939-41(1955)	29	10-3620	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
2342	10-394	Phys. Rev. <u>100</u> , 32-6(1955)	25	10-2313	See A-3552
2349	10-349	Phys. Rev. <u>100</u> , 74-80(1955)	26	10-2458	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2350	10-450	Phys. Rev. <u>100</u> , 81-2(1955)	23	10-2463	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2354	10-1979	J. Biol. Phot. Assoc. <u>23</u> , Nos. 2 & 3, 74-7(1955)	BT		
2359	10-1260	Nucleonics <u>13</u> , No. 12, 62(1955)	8	10-3528	See AECD-3867
2372	10-1274	J. Am. Chem. Soc. <u>77</u> , 5852-5(1955)	22	10-2360	See A-726
2380	10-362	Phys. Rev. <u>100</u> , 306-23(1955)	53	10-2364	See A-2314
2383	10-2519	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	60	10-2365	See A-2321
2384	10-2520	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	C		
2385	10-1548	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	0.350.4	10-3537	See AECD-3937
2386	10-1549	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	0.380.1	10-3590	See AECD-3951
2388	10-2327	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	0.380.8	10-3536	See AECD-3935
2389	10-2201	Phys. Rev. <u>100</u> , 1334-8(1955)	1.365.5	10-3543	See AECD-3955
2390	10-3399	Dep.; \$0.15(OTS)	2.355.1	10-3534	See AECD-3917
2392	10-2521	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2.355.2	10-3542	See AECD-3954
2393	10-3679	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	2.355.3	10-3546	See AECD-3965
2394	10-3400	Dep.; \$0.10(OTS)	2.381.4	10-3529	See AECD-3875
2395	10-3146	Dep.; \$0.25(OTS)	4.360.2	10-3541	See AECD-3953
2396	10-3345	Dep.; \$0.15(OTS)	4.360.9	10-3535	See AECD-3932
2397	10-1550	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	5.350.3	10-3539	See AECD-3947
2399	10-2328	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	5.350.5	10-3540	See AECD-3952
2401	10-1635	Phys. Rev. <u>100</u> , 1013-14(1955)	5.350.6	10-3545	See AECD-3960
2402	10-2132	Phys. Rev. <u>100</u> , 1487-9(1955)	25	10-2563	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
2408	10-1593	Phys. Rev. <u>100</u> , 886-90(1955)	102	10-3680	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
2422	10-2211	Phys. Rev. <u>100</u> , 324-7(1955)	CC		
2428	10-2175	Phys. Rev. <u>100</u> , 1309-14(1955)	244	10-3483	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2437	10-1566	Nucleonics <u>13</u> , No. 12, 64-8(1955)	1321	10-3480	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
			1366	10-2377	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)



Report	Abstract	Availability	Report	Abstract	Availability
CC			CF (ORNL)		
1383	10-3681	Dep.(mc); \$13.80(ph OTS); \$2.40(mf OTS)	48-2-139	10-3688	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1432	10-2285	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	48-8-328	10-2549	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2009	10-1288	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	48-9-128	10-2564	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
2123	10-3618	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	48-10-219	10-3433	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
2400	10-3598	See M-4585	49-1-193	10-2524	Dep.(mc); \$13.80(ph OTS); \$4.80(mf OTS)
2401	10-3484	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	49-1-238	10-2525	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2403	10-3427	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	49-4-123	10-2526	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
2522	10-3755	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	49-9-69	10-2527	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2670	10-3428	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	49-11-48	10-3689	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2715	10-3598	See M-4585	49-11-217	10-2528	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
2933	10-3429	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	49-11-226	10-2529	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2957	10-2378	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	49-12-1	10-3690	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2962	10-3485	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	49-12-18	10-3691	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
2984	10-3430	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	49-12-30	10-3692	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3069	10-3415	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	49-12-48	10-3693	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3161	10-3470	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	49-12-82	10-3694	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3241	10-3431	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	49-12-83	10-3695	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3302	10-3548	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	50-1-45	10-2558	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
3336	10-3549	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	50-1-157	10-2558	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3489	10-744	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	50-4-17	10-3696	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3638	10-3432	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	50-4-148	10-3697	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
CD			50-5-140	10-3698	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
454	10-1317	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	50-8-85(Rev.)	10-2560	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
564-CEL-A	10-3527	See AECD-3854	50-9-139	10-3699	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
954-14	10-3481	See AECD-3859	51-2-102	10-3550	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
4003	10-3530	See AECD-3897	51-6-91	10-2338	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
4005	10-3538	See AECD-3945	51-7-106	10-3700	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
4016	10-3544	See AECD-3959	51-7-120	10-3486	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
5560	10-3592	See AECD-3896	51-9-63	10-2246	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
CE			51-9-112	10-2530	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
364	10-3471	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	51-10-28	10-3487	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
805	10-3682	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)	51-10-97	10-3475	Dep.; \$21.30(ph OTS); \$6.90(mf OTS)
1074	10-2522	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	51-11-44	10-3551	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1132	10-3683	Dep.(mc); \$19.80(ph OTS); \$6.30(mf OTS)	51-12-1	10-2531	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1149	10-3684	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)	51-12-67	10-3552	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1150	10-3685	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	52-2-55	10-3645	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
CF (Argonne National Lab.)			52-2-72	10-2287	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
863	10-3646	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	52-2-164	10-3488	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
3341	10-3707	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	52-2-217	10-2329	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
CF (Columbia Univ.)			52-2-232	10-3701	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
338	10-3757	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	52-3-34	10-2396	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
CF (ORNL)			52-3-134	10-2532	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
45-2-1	10-3732	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	52-3-155	10-2321	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
45-6-144	10-2286	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	52-4-39	10-2533	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
46-6-23	10-3686	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	52-4-157	10-2561	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
47-4-34	10-3687	Dep.(mc); \$13.80(ph OTS); \$4.80(mf OTS)	52-5-211	10-2553	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
47-8-240	10-2245	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	52-6-33	10-3606	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
47-9-305	10-2523	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	52-6-67	10-3018	Dep.; \$0.15(OTS)
47-9-370	10-2541	See M-4128	52-9-75	10-3702	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
47-12-58	10-2450	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	52-12-118	10-2534	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
			53-1-283	10-3489	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
			53-4-48	10-2535	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
			53-5-105	10-3859	See AECD-3720

Report	Abstract	Availability	Report	Abstract	Availability
CF (ORNL)			COO		
53-5-139	10-3382	See AECD-3716	207	10-1370	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)
53-9-96	10-3756	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	210	10-1162	Dep.; \$7.80(ph OTS); \$3.30(mf OTS)
53-9-134	10-3703	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	1015	10-3292	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)
54-1-104	10-3383	See AECD-3719	CP		
54-2-159	10-3666	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	499	10-3708	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
54-3-171	10-3607	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	597	10-3647	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
54-3-175	10-3704	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1350	10-3709	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
54-5-200	10-3744	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	1456	10-3710	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
54-11-15	10-3805	See AECD-3717	1589	10-3758	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
54-12-143	10-3705	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1598	10-3759	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
55-1-120	10-3706	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1662	10-3711	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
56-1-94	10-3325	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1676	10-3736	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
56-1-130	10-3266	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1729	10-3658	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
56-1-162	10-3248	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	1732	10-3760	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
56-2-78	10-3219	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	1818	10-3748	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
56-2-79	10-3312	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1837	10-3608	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
56-2-90	10-3279	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	2261	10-3746	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
56-3-60	10-3173	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	2541	10-3636	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
56-3-65	10-3243	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2558	10-3659	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
56-3-170	10-3650	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	2907	10-3712	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
CH			CRD-A		
2782	10-3408	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)	19-27(Pt. 3)	10-3604	See AECD-3916
CHEM-S			19-27(Pt. 5)	10-3605	See AECD-3949
231	10-3565	See RL-4.6.231	CRD-T		
CK			2B-20	10-3589	See AECD-3847
942	10-3500	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	2B-47	10-3734	See AECD-3941
1359	10-3501	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	4A-18	10-3642	See AECD-3848
1529	10-3502	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	4A-23	10-3643	See AECD-3849
1712	10-3503	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	CT		
CL			816	10-3761	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
1039	10-3416	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	883	10-3713	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
CL-SLS			890	10-2441	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
1	10-3673	See AECD-3869	895	10-3714	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
CN			1571	10-3609	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
527	10-2397	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	1897	10-3715	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
795	10-3553	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3522	10-836	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1060	10-2379	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3718	10-837	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1702	10-3504	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	CU		
2041	10-3434	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	11-56-AT-1042-Ch.E.	10-3187	See NYO-7638
2043	10-2972	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	97-56-ONR-1-Phys.	10-3032	See NEVIS-16
2069	10-2456	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	144	10-3852	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
2086	10-2346	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	CWC-ED		
2334	10-3593	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	1	10-3468	See M-4558
CNL			D		
17	10-2490	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)	4.250.13	10-3619	See AECD-3966
39	10-2380	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	21	10-2273	See A-4017
41	10-3490	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)			

Report	Abstract	Availability	Report	Abstract	Availability
D			DOW		
23	10-3424	See A-4018	114	10-707	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
28	10-2274	See A-4022	115	10-708	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
D-R			116	10-709	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
29	10-2370	See A-3226	117	10-710	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
60	10-2371	See A-3254	119	10-2662	Dep.; \$0.20(OTS)
DC			120	10-711	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)
55-4-46	10-3004	See APEX-238	122	10-712	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)
55-7-41	10-3838	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	125	10-713	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
DCF			127	10-714	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)
5704	10-1803	See AECD-3665	129	10-715	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
DOW			131	10-3122	Dep.; \$0.55(OTS)
62	10-676	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)	132	10-716	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
63	10-677	Dep.(mc); \$13.80(ph OTS); \$4.80(mf OTS)	136	10-717	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
67	10-678	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)	138	10-2044	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
68	10-679	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	141	10-3180	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
69	10-680	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)	DP		
72	10-681	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)	33	10-3142	Dep.; \$0.30
74	10-682	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)	64	10-3377	Dep.; \$0.20(OTS)
76	10-586	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)	72	10-3331	Dep.; \$0.15(OTS)
79	10-683	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)	74	10-3435	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
80	10-684	Dep.(mc); \$13.80(ph OTS); \$4.80(mf OTS)	75	10-3436	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
81	10-3112	Dep.; \$0.45(OTS)	76	10-1235	Dep.; \$0.25(OTS)
82	10-2749	Dep.; \$0.15(OTS)	100	10-2536	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
83	10-685	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)	DPW		
84	10-686	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)	2071	10-3752	See AECD-3856
85	10-687	Dep.(mc); \$13.80(ph OTS); \$4.80(mf OTS)	DR		
86	10-688	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	971	10-3668	See M-2273
87	10-689	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)	972	10-3669	See M-2554
88	10-690	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	973	10-3670	See M-2555
89	10-1289	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)	EAH		
92	10-745	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	69	10-3621	See EAH-87
93	10-691	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	87	10-3621	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)
94	10-692	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)	ETL		
95	10-693	Dep.(mc); \$13.80(ph OTS); \$4.80(mf OTS)	1	10-2408	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
96	10-694	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)	2	10-2409	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
97	10-695	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)	3 and 4	10-2410	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)
99	10-696	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	5	10-2411	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
100	10-697	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)	6	10-2412	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
101	10-698	Dep.(mc); \$13.80(ph OTS); \$4.80(mf OTS)	7	10-2413	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
103	10-699	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)	8	10-2414	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
104	10-700	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)	9	10-2415	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
105	10-701	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)	10	10-2416	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
107	10-702	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	11	10-2417	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
108	10-703	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	12	10-2418	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
109	10-704	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	13	10-2419	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
110	10-705	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	14 and 15	10-2420	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
113	10-706	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	16 and 17	10-2421	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)



Report	Abstract	Availability	Report	Abstract	Availability
ETL			HW		
18	10-2422	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	19563	10-2538	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
19	10-2423	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	20722	10-2539	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
20	10-2424	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	20765	10-3596	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
21	10-2425	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	21520	10-2430	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
22	10-2426	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	21793	10-1032	Dep.; \$0.25(OTS)
23	10-2427	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	<del>22920</del>	10-2294	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
FMPC			23314	10-2431	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
310	10-2457	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	23581	10-2442	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
GE-HB			25108	10-2247	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)
7	10-2507	See A-4257	25239	10-3410	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
GE-HH			<del>25337</del>	10-2432	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
5	10-2402	See A-4254	26207	10-949	Dep.; \$0.25(OTS)
H			<del>26323</del>	10-2433	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
4,360,12	10-3533	See AECD-3911	27061	10-1552	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
4,360,14	10-3532	See AECD-3910	<del>27090</del>	10-3637	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
HEPL (Misc.)			27910	10-2875	Anal. Chem. <u>28</u> , 274(1956)
58	10-1014	See AECU-3104	<del>29748</del>	10-1033	Dep.; \$0.15(OTS)
HW			30119	10-2577	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
7737	10-2288	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	30643(Rev.)	10-61	Dep.; \$0.20(OTS)
<del>8309</del>	10-2381	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	<del>30898</del>	10-3441	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
10137	10-2382	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	32516	10-2810	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
<del>10940</del>	10-3716	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	<del>32534</del>	10-2811	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
11379	10-2480	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	32696	10-2812	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
12450	10-2383	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	32720	10-2813	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
12552	10-3594	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	34079(Rev.)	10-2048	Dep.; \$0.20(OTS)
<del>12832</del>	10-3762	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	34499	10-3183	Dep.; \$6.30(ph OTS); \$8.00(mf OTS)
13167	10-2537	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	<del>35038</del>	10-1554	Dep.; \$0.25(OTS)
<del>13300</del>	10-3437	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	35917	10-513	Dep.; \$28.80(ph OTS); \$8.40(mf OTS)
13301	10-2289	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	<del>36092</del>	10-792	Dep.; \$0.30(OTS)
<del>15050</del>	10-2481	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	<del>36831</del>	10-1203	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
14226	10-2290	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	<del>37636</del>	10-608	Dep.; \$0.30(OTS)
<del>15044</del>	10-2291	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	<del>37983</del>	10-3190	Dep.; \$0.15(OTS)
<del>15204</del>	10-2482	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	<del>38079</del>	10-759	Welding J. (N. Y.) <u>35</u> , 307-10(1956)
<del>15742</del>	10-2330	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	<del>38198</del>	10-838	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)
<del>15829</del>	10-3595	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	38218(Rev.)	10-3409	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
<del>15846</del>	10-3438	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	38387	10-3003	Dep.; \$0.20(OTS)
17046	10-2292	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	<del>38882</del>	10-376	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
17175	10-3439	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	38757	10-3141	Dep.; \$0.10(OTS)
<del>17266</del>	10-2347	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	<del>38758</del>	10-3774	Dep.; \$9.30(ph OTS); \$3.60(mf OTS)
17521	10-2339	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	38876	10-1163	Dep.; \$7.80(ph OTS); \$3.30(mf OTS)
17775	10-2398	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	<del>38912</del>	10-1034	Dep.; \$0.20(OTS)
<del>18083</del>	10-2429	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	<del>38962</del>	10-1638	Dep.; \$0.10(OTS)
<del>18146</del>	10-2293	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	<del>38991</del>	10-2091	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
<del>18320</del>	10-3440	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	39087	10-1446	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
<del>18478</del>	10-2399	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	39170	10-1318	Dep.; \$0.15(OTS)
<del>18924</del>	10-2315	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	<del>39190</del>	10-1857	Dep.; \$0.20(OTS)
			<del>39556</del>	10-1810	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
			<del>39632</del>	10-1695	Dep.; \$0.30(OTS)
			39589	10-3337	Dep.(mc); \$19.80(ph OTS); \$6.30(mf OTS)
				10-3049	Dep.; \$0.10(OTS)

Report	Abstract	Availability	Report	Abstract	Availability
HW			IDO		
39767	10-3001	Dep.; \$0.15(OTS)	16118	10-3401	Dep.; \$0.25(OTS)
39805	10-2718	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	16125	10-1044	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
39945	10-2614	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	16127	10-1045	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
39969	10-3002	Dep.; \$0.25(OTS)	16131	10-1046	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
39971	10-3105	Dep.; \$3.30(OTS); \$2.40(mf OTS)	16133	10-1047	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
40142	10-2977	Dep.; \$9.30(ph OTS); \$3.60(mf OTS)	16136	10-1048	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
40285	10-3106	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	16138	10-377	Dep.(mc); \$10.80 (ph OTS); \$3.90 (mf OTS)
40459	10-3209	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	16140	10-1049	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
40460	10-3125	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	16141	10-567	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
40494	10-3050	Dep.; \$0.20(OTS)	16155	10-1050	Dep.; \$7.80(ph OTS); \$3.30(mf OTS)
40497	10-3107	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	16161	10-2891	Dep.; \$0.25(OTS)
40866	10-3360	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	16168	10-3158	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
41025	10-3275	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	16173	10-2108	Dep.; \$0.25(OTS)
41713	10-3780	Dep.; \$0.10(OTS)	16179	10-378	Dep.(mc); \$4.80 (ph OTS); \$2.70 (mf OTS)
HW-R			16180	10-2166	Dep.; \$0.20(OTS)
13051	10-3474	See AECD-3865	16182	10-2892	Dep.; \$0.25(OTS)
IDO			16186	10-1051	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
14313	10-746	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	16187	10-1052	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
14334	10-115	Dep.; \$0.40 (OTS)	16189	10-2026	Dep.; \$0.30(OTS)
14336	10-1453	Dep.; \$0.20(OTS)	16195	10-1144	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
14347	10-2655	Dep.; \$0.25(OTS)	16200	10-1053	Dep.; \$0.25(OTS)
14352	10-839	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	16208	10-2893	Dep.; \$0.35(OTS)
14357	10-1737	Dep.; \$0.25(OTS)	16210	10-379	Dep.; \$0.20 (OTS)
16005	10-3870	Dep.; \$0.30(OTS)	16211	10-1614	J. Chem. Phys. <u>23</u> , 2108-10(1955)
16014	10-1035	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	16213	10-3147	Dep.; \$0.60(OTS)
16020	10-1036	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	16214	10-1925	Dep.; \$0.25(OTS)
16022	10-2886	Dep.; \$0.15(OTS)	16223	10-241	Dep.; \$0.20 (OTS)
16026	10-1037	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	16226	10-1907	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
16031	10-1038	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	16241	10-380	Dep.; \$0.20 (OTS)
16035	10-1039	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	16243	10-381	Dep.; \$0.30 (OTS)
16036	10-2887	Dep.; \$0.20(OTS)	16246	10-1087	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
16047	10-1555	Dep.; \$0.70(OTS)	16247	10-3157	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
16056	10-2483	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	16248	10-3040	Dep.; \$0.20(OTS)
16057	10-1100	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	16249	10-1054	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
16064	10-3871	Dep.; \$0.25(OTS)	16250	10-3041	Dep.; \$0.20(OTS)
16067	10-2139	Dep.; \$0.20(OTS)	16251	10-2894	Dep.; \$0.15(OTS)
16071	10-1040	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	16252	10-3148	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
16074	10-128	Dep.; \$0.10 (OTS)	16259	10-3825	Dep.; \$0.30(OTS)
16075	10-1041	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	IMCC		
16076	10-2750	Dep.; \$0.15(OTS)	2041	10-65	See RMO-2021
16078	10-3717	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	2155	10-1294	See RMO-2032
16083	10-1042	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	2208	10-1295	See RMO-2037
16084	10-1924	Dep.; \$0.20(OTS)	2209	10-1296	See RMO-2038
16093	10-1043	Dep.; \$0.15(OTS)	2210	10-1297	See RMO-2039
16095	10-2888	Dep.; \$0.25(OTS)	2212	10-3113	See RMO-2041
16100	10-2889	Dep.; \$0.30(OTS)	ISC		
16105	10-2890	Dep.; \$0.20(OTS)	247	10-568	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
16114	10-2165	Dep.; \$0.25(OTS)	377	10-2719	Dep.; \$0.35(OTS)

Report	Abstract	Availability	Report	Abstract	Availability
ISC			K		
458	10-2989	Dep.; \$0.30(OTS)	101	<del>10-3558</del>	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
463	10-2720	Dep.; \$0.20(OTS)	104	10-2340	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
505	10-62	Dep.(mc); \$4.80 (ph OTS); \$2.70 (mf OTS)	120	10-2682	Dep.; \$0.20(OTS)
527	10-3887	Dep.; \$0.30(OTS)	137	10-2401	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
530	10-569	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	236	10-3411	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
536	10-109	Dep.(mc); \$3.30 (ph OTS); \$2.40 (mf OTS)	273	10-3577	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
539	10-79	Anal. Chem. <u>27</u> , 1737-41(1955)	276	10-2404	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
540	10-80	Dep.(mc); \$3.30 (ph OTS); \$2.40 (mf OTS)	286	10-2484	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
545	10-840	J. Metals <u>8</u> , 132-8(1956)	299(Rev.)	10-3763	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
549	10-718	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	315	10-3554	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
555	10-1518	Dep.; \$0.35(OTS)	316	10-3578	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
563	10-2032	J. Chem. Phys. <u>23</u> , 2258-63(1955)	372	10-3497	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
574	10-570	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	373	10-3597	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
579	10-1742	Anal. Chem. <u>28</u> , 79-81(1956)	416	10-3579	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
584	10-609	Dep.; \$0.20(OTS)	421	10-3555	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
586	10-3102	Dep.; \$0.50(OTS)	434	10-3123	Dep.; \$0.15(OTS)
588	10-2180	Dep.; \$0.40(OTS)	447	10-3491	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
596	10-1236	Dep.; \$0.25(OTS)	482	10-3556	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
612	10-2045	Dep.; \$0.45(OTS)	497	10-3638	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
613	10-1602	Phys. Rev. <u>100</u> , 796-8(1955)	513	10-3443	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
617	10-1755	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	706	10-3181	Dep.; \$0.25(OTS)
622	10-3048	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	719	10-3557	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
623	10-1741	Anal. Chem. <u>28</u> , 18-21(1956)	757	10-3639	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
624	10-1827	Metal Progr. <u>68</u> , No. 6, 77-80(1955)	843	10-3464	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
629	10-2207	Phys. Rev. <u>100</u> , 1407-9(1955)	1071	10-1703	Dep.; \$0.20(OTS)
634	10-634	Dep.; \$0.25(OTS)	1088	10-1994	Dep.; \$0.15(OTS)
642	10-1774	Dep.; \$0.15(OTS)	1106	10-3346	Dep.; \$0.25(OTS)
643	10-571	Dep.; \$0.20(OTS)	1222	10-242	Dep.; \$0.20 (OTS)
644	10-3196	Dep.; \$0.25(OTS)	1223	10-1490	Dep.; \$0.20(OTS)
645	10-331	Dep.; \$0.25 (OTS)	1232	10-1213	Dep.; \$0.35(OTS)
656	10-3011	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	1236	10-3837	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)
663	10-3108	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	1243	10-1335	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
676	10-3022	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	1264	10-6353	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)
682	10-2990	Dep.; \$0.15(OTS)	1272	10-3841	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
688	10-3197	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	1275	10-3883	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
707	10-3367	Dep.; \$0.25(OTS)	1277	10-3374	Dep.; \$0.20(OTS)
710	10-3788	Dep.; \$0.20(OTS)	1284	10-3842	Dep.; \$0.25(OTS)
716	10-3826	Dep.; \$0.35(OTS)	KAPL		
JWD			24	10-3718	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
40	10-3466	See A-2553	41	10-1056	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
64	10-3423	See A-3502	42	10-1001	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
69	10-3521	See A-3506	58	10-1057	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
70	<del>10-3521</del>	See A-3507	62	10-1639	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
74	10-2325	See A-3511	130	10-3587	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
76	10-2312	See A-3513	180	10-3340	Dep.; \$0.35(OTS)
K			192	10-1237	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
2.19.10	10-2276	See A-4174	200	10-3174	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
39	<del>10-3441</del>	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	210	10-3444	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
81	<del>10-3441</del>	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	304	<del>10-3718</del>	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)



Report	Abstract	Availability	Report	Abstract	Availability
KAPL			KLO		
337	10-3198	Dep.; \$0.25(OTS)	87	10-3597	See K-373
421	10-2384	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	107	10-3579	See K-416
428	10-3888	Dep.; \$0.20(OTS)	112	10-3555	See K-421
527	10-3720	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	127	10-3491	See K-447
528	10-3721	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	138	10-3556	See K-482
531	10-1336	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	143	10-3638	See K-497
532	10-1337	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	148	10-3443	See K-513
546	10-1556	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	KLX		
551	10-3722	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)			
789	10-3472	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	35	10-3558	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
813	10-1058	Dep.(mc); \$13.80(ph OTS); \$4.80(mf OTS)	37	10-3559	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
828	10-2092	Dep.; \$0.20(OTS)	1036	10-3588	Dep.(mc); \$7.80(ph OTS); \$3.00(mf OTS)
834	10-2663	Dep.; \$0.15(OTS)	1356	10-3477	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
851	10-2236	Dep.; \$0.25(OTS)	1384	10-3635	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
854	10-3332	Dep.; \$0.15(OTS)	1392	10-2322	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
919	10-3404	Dep.; \$0.25(OTS)	KT		
964	10-3723	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)			
1110	10-3299	Dep.; \$0.20(OTS)	104	10-3482	See AECD-3905
1154	10-2683	Dep.; \$0.25(OTS)	183	10-2105	Dep.; \$0.25(OTS)
1158	10-1975	Dep.; \$0.15(OTS)	KY		
1301	10-1849	Dep.; \$0.15(OTS)			
1318	10-1002	Dep.; \$0.20(OTS)	166	10-3203	Dep.; \$0.20(OTS)
1376	10-2058	Dep.; \$13.80(ph OTS); \$4.80(mf OTS)	LA		
1377	10-3103	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)			
1384	10-119	Dep.; \$0.40 (OTS)	28	10-2504	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1399	10-243	Dep.; \$4.80 (ph OTS); \$2.70 (mf OTS)	42	10-2443	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
1403	10-1599	Dep.; \$0.30(OTS)	44	10-3610	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
1406	10-1772	Dep.; \$0.20(OTS)	47	10-3724	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1411	10-1372	Dep.; \$0.40(OTS)	55	10-2568	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
1414	10-1926	Dep.; \$0.20(OTS)	76	10-2505	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1415	10-2804	Dep.; \$0.30(OTS)	78	10-2444	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1416	10-2073	Dep.; \$0.40(OTS)	81	10-2569	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1422	10-1454	Dep.; \$0.25(OTS)	91	10-2506	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
1425	10-1238	Dep.; \$0.20(OTS)	112	10-3505	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1431	10-2615	Dep.; \$0.15(OTS)	147	10-2385	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1443	10-3244	Dep.; \$0.25(OTS)	149	10-2386	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1444	10-1738	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	172	10-3506	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1453	10-3293	Dep.; \$0.20(OTS)	243	10-2550	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1454	10-888	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	266	10-3667	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1463	10-3779	Dep.; \$7.80(ph OTS); \$3.30(mf OTS)	313	10-2387	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1467	10-3843	Dep.; \$0.15(OTS)	347	10-2348	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1469	10-3220	Dep.; \$0.30(OTS)	381	10-3507	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1471	10-3872	Dep.; \$0.15(OTS)	502	10-2349	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1523	10-3804	Dep.; \$0.25(OTS)	507	10-2295	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
LI			603	10-2491	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
			609	10-3749	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
198	10-2975	Dep.; \$0.15(OTS)	639	10-2350	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
LO			695	10-2388	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
			696	10-2296	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
D(Rev.)	10-3763	See K-299(Rev.)	703	10-2297	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)

Report	Abstract	Availability	Report	Abstract	Availability
LA			M		
738	10-2298	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	2142	10-3560	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
739	10-2299	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	2273	10-3668	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
742	10-3795	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	2327	10-3492	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1128	10-2300	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	2554	10-3669	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1158	10-3764	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	2555	10-3670	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1197	10-2301	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	3712	10-3735	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1308	10-1200	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)	3832	10-837	See CT-3718
1314	10-2351	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3845	10-3582	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1315	10-2352	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	3848	10-3583	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
1336	10-1145	Dep.; \$0.25(OTS)	4087	10-3412	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1343	10-2389	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	4128	10-2541	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)
1345	10-2302	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	4168	10-3585	Dep.(mc); \$15.30(ph OTS); \$5.40(mf OTS)
1369	10-2390	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	4241(Pt. III)	10-3493	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1423	10-3775	Dep.; \$0.30(OTS)	4245	10-1239	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
1439	10-2391	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	4337	10-3414	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1550	10-2257	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	4480	10-2542	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)
1567	10-3267	See LA-1721(Rev.)	4483	10-3414	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1721(Rev.)	10-3267	\$1.25(OTS)	4534	10-2303	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1722	10-3267	See LA-1721(Rev.)	4556	10-3467	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
1913	10-1760	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	4558	10-3468	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
1930	10-3801	Dep.; \$0.30(OTS)	4576	10-3671	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1940	10-1619	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	4585	10-3598	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
1947	10-1739	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	MCW		
1960	10-2171	Dep.; \$0.25(OTS)	103	10-3561	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
LAMS			134	10-3445	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
121	10-3648	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	136	10-3562	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
727	10-2540	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	248	10-747	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
769	10-2472	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	MEMO-LFE		
1082	10-1640	Dep.; \$0.10(OTS)	1	10-3857	See AECD-3709
1040	10-3160	Dep.; \$0.20(OTS)	Memo-NEC		
1073	10-3155	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	6	10-1336	See KAPL-531
LRL			7	10-1337	See KAPL-532
76	10-2057	Dep.; \$0.20(OTS)	MIT		
83	10-1938	Dep.; \$0.20(OTS)	1028	10-3739	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
88	10-2074	Dep.; \$0.25(OTS)	1090	10-3611	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
101	10-1332	Dep.; \$0.20(OTS)	1091	10-2193	Dep.; \$0.20(OTS)
158	10-912	Dep.; \$0.35(OTS)	1092	10-3817	Dep.; \$0.20(OTS)
160	10-2459	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1105	10-1766	Dep.; \$0.20(OTS)
LWS			1110	10-1740	Dep.; \$0.45(OTS)
12019	10-3660	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	MIT-TR		
12066	10-841	Dep.; \$0.15(OTS)	4	10-3525	See AECD-3851
22514(Pt.5)	10-3605	See AECD-3949	8	10-3425	See AECD-3850
23014	10-3643	See AECD-3849	14	10-610	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
23085	10-3734	See AECD-3941	MITG		
			244	10-3563	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
			208	10-3562	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)

Report	Abstract	Availability	Report	Abstract	Availability
MITG-A			MTA		
111	10-3347	Dep.; \$0.25(OTS)	36	10-2965	Dep.; \$0.20(OTS)
ML (Misc.)			41	10-2237	Dep.; \$0.20(OTS)
265	10-406	See AECU-3046	MTRL		
MLM			54-91	10-1054	See IDO-16249
188	10-3617	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	54-92	10-3041	See IDO-16250
205	10-1427	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	202	10-3040	See IDO-16248
229	10-2485	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	247	10-1087	See IDO-16246
232	10-116	Dep.; \$0.20 (OTS)	MUC-AMW		
291	10-3622	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	36	10-3402	See N-985
373	10-3375	Dep.; \$0.30(OTS)	MUC-WPJ		
567	10-3126	Dep.; \$0.35(OTS)	14	10-2486	See N-812
572	10-2112	Dep.; \$0.30(OTS)	N		
615	10-1428	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	812	10-2486	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
641	10-3378	See TID-5087	985	10-3402	Dep.; \$0.15(OTS)
677	10-1429	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	1367	10-2487	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
729	10-2684	Dep.; \$0.15(OTS)	1372	10-2464	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
748	10-3789	Dep.; \$0.20(OTS)	NAA-AL		
761	10-2578	Dep.; \$0.40(OTS)	228	10-3672	See AECD-3862
808	10-1430	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	NAA-SR		
896	10-2195	Dep.; \$0.15(OTS)	4	10-2316	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
976	10-3252	Science <u>121</u> , 97-8(1955) (Condensed)	10	10-2317	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
995	10-2979	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)	16	10-2407	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
1003	10-3844	Dep.; \$0.25(OTS)	20	10-2318	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
1020	10-3300	Dep.; \$0.25(OTS)	24	10-2492	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
1022	10-645	Dep.; \$0.25(OTS)	49	10-2465	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1050	10-3163	Dep.; \$0.15(OTS)	58	10-2445	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
1052	10-3777	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	67	10-2319	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1055	10-1240	Anal. Chem. <u>27</u> , 1875-8(1955)	68	10-2320	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
1057	10-2966	Dep.; \$0.15(OTS)	138	10-3899	Dep.; \$0.30(OTS)
1059	10-511	J. Bacteriol. <u>69</u> , 607-15(1955)	168	10-2554	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
1060	10-1839	Dep.; \$0.15(OTS)	196	10-2649	Dep.; \$0.25(OTS)
MLM-CF			202	10-3786	Dep.; \$0.15(OTS)
54-12-2	10-1839	See MLM-1060	248	10-2555	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
MonC			268	10-3368	Dep.; \$0.35(OTS)
132	10-3740	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	275	10-2544	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
398	10-3725	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	286	10-2497	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
MonP			287	10-3882	Dep.; \$0.25(OTS)
246	10-3873	Dep.; \$0.35(OTS)	845	10-3853	Dep.; \$0.20(OTS)
356	10-3861	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	924	10-3874	Dep.; \$0.20(OTS)
387	10-3230	Dep.; \$0.20(OTS)	926	10-3348	Dep.; \$0.25(OTS)
360	10-2543	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	1016	10-3379	Dep.; \$0.20(OTS)
428	10-3726	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	1029	10-3313	Dep.; \$0.25(OTS)
434	10-3727	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	1057	10-3797	Dep.; \$0.20(OTS)
457	10-3728	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	1102	10-3314	Dep.; \$0.25(OTS)
MonT					
164	10-3641	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)			
408	10-2331	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)			



Report	Abstract	Availability	Report	Abstract	Availability
NAA-SR			NYO		
1137(Pt.1)	10-1495	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	110(DeL.)	10-2446	Dep.(mc); \$33.30(ph OTS); \$9.60(mf OTS)
1152	10-3405	Dep.; \$0.25(OTS)	111	10-1508	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
1204	10-3315	Dep.; \$0.20	1093	10-1215	Dep.; \$0.20(OTS)
1205	10-2258	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)	1127	10-2447	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
1398	10-3156	Dep.; \$0.30(OTS)	1323	10-1290	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1445	10-3333	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	1325	10-636	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1452	10-3307	Dep.; \$0.30(OTS)	1455	10-1291	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1458	10-2968	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	1516	10-851	Dep.; \$0.20(OTS)
1477	10-3322	Dep.; \$0.20(OTS)	1521	10-2248	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
1525	10-3316	Dep.; \$0.50(OTS)	3108	10-578	Dep.; \$10.80(ph OTS); \$3.90(mf OTS)
NAA-SR-Memo			3313	10-654	Dep.; \$1.50(OTS)
1104	10-3254	See AECD-3728	3320	10-515	Dep.; \$0.35(OTS)
1475	10-3149	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3345	10-955	Dep.; \$0.45(OTS)
NBL			3499	10-147	Dep.; \$4.80 (ph OTS); \$2.70 (mf OTS)
117	10-81	Dep.; \$0.30 (OTS)	3535	10-3747	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
NBS (Misc.)			3557	10-732	Anal. Chem. 27, 1770-4(1955)
302	10-2304	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3559	10-731	Anal. Chem. 27, 1704-7(1955)
3315	10-488	Dep.; \$3.30 (ph OTS); \$2.40 (mf OTS)	3606	10-611	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
3329	10-63	Dep.; \$3.30 (ph OTS); \$2.40 (mf OTS)	3738	10-3354	Dep.; \$0.15(OTS)
4031	10-3361	Dep.; \$0.20(OTS)	3783	10-1947	J. A. Ceram. Soc. 38, 423-32(1955)
4161	10-1726	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	3784	10-3845	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
4342	10-952	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	3873	10-590	J. Am. Chem. Soc. 75, 2777-8(1953)
4420	10-3136	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3908	10-2030	J. Chem. Phys. 23, 2410-14(1955)
4514	10-3217	Dep.(mc); \$16.80(ph OTS); \$5.70(mf OTS)	3916	10-3124	Dep.; \$0.35(OTS)
NBS-C (Misc.)			3918	10-1320	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
562	10-2976	Dep.(mc); \$0.50 GPO	3919	10-1641	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)
567	10-2787	\$1.00(GPO)	3920	10-1728	Dep.; \$9.30(ph OTS); \$3.60(mf OTS)
568	10-3185	Dep.; \$0.20(GPO)	3921	10-3276	Dep.; \$0.20(OTS)
NBS-D			4232	10-1341	Dep.; \$0.15(OTS)
101	10-640	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	4640	10-252	Dep.; \$0.20 (OTS)
131	10-3603	See AECD-3903	4641	10-754	Dep.; \$0.35(OTS)
NDA			4642	10-516	Dep.; \$1.00(OTS)
16	10-3150	Dep.; \$9.30(ph OTS); \$3.60(mf OTS)	4644	10-10	Dep.; \$0.15 (OTS)
NEVIS			4654	10-2593	Dep.; \$1.25(OTS)
13	10-2133	Phys. Rev. 100, 1490-3(1955)	4824	10-1167	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
16	10-3032	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)	5072	10-924	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
NLCO			5087	10-3446	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
595	10-3175	Dep.; \$0.75(OTS)	5119	10-748	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
NMI			5123	10-3599	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1119	10-2077	Dep.; \$0.30(OTS)	5130	10-3447	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
			5131	10-1146	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
			5134	10-3448	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
			5144	10-3417	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
			5163	10-3413	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
			5164	10-3564	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
			5191	10-719	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
			5195	10-3765	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
			5208	10-3449	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
			5210	10-3450	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)

Report	Abstract	Availability	Report	Abstract	Availability
NYO			ORINS		
5213	10-3451	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	10	10-544	Dep.; \$0.75(OTS)
5214	10-3452	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)			
5217	10-3453	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	ORNL		
5218	10-3454	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	19	10-2323	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
5219	10-3455	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	25	10-2406	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
5225	10-3612	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	26	10-2545	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
5229	10-3456	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	196	10-1452	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
5230	10-3457	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	388	10-3623	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
5236	10-3458	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	550	10-2546	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
6148	10-3159	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	563	10-3729	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
6264	10-1229	Mining Eng. 7, 958-62(1955)	692	10-2169	Dep.; \$0.30(OTS)
6268	10-312	Dep.; \$10.80 (ph OTS); \$3.90 (mf OTS)	701	10-3730	Dep.(mc); \$22.80(ph OTS); \$7.20(mf OTS)
6328	10-2023	Dep.; \$0.20(OTS)	887	10-579	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
6451	10-1342	Dep.; \$0.20(OTS)	1047	10-720	Dep.; \$0.25(OTS)
6457	10-3034	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	1064	10-3324	Dep.; \$0.25(OTS)
6478	10-235	Dep.; \$0.30 (OTS)	1144	10-3025	Dep.; \$0.20(OTS)
6482	10-2805	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	1317	10-1118	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
6506	10-2997	Dep.; \$0.70(OTS)	1396	10-3109	Dep.; \$0.25(OTS)
6590	10-2008	Dep.; \$0.20(OTS)	1419	10-3349	Dep.; \$0.20(OTS)
6599	10-1814	Dep.; \$0.15(OTS)	1422	10-3836	Dep.; \$1.00(OTS)
6626	10-1601	Dep.; \$0.55(OTS)	1469(Suppl.2)	10-1016	Dep.; \$0.30(OTS)
7048	10-183	Dep.; \$1.80 (ph OTS); \$1.80 (mf OTS)	1476	10-3334	Dep.; \$0.20(OTS)
7049	10-2081	Dep.; \$0.25(OTS)	1783	10-3890	Dep.; \$0.40(OTS)
7050	10-1383	Dep.; \$0.25(OTS)	1790	10-3875	Dep.; \$0.30(OTS)
7051	10-2082	Dep.; \$0.20(OTS)	1837	10-1325	Anal. Chem. 27, 1923-7(1955)
7053	10-1384	Dep.; \$0.20(OTS)	1860	10-42	Dep.; \$6.30 (ph OTS); \$3.00 (mf OTS)
7054	10-3285	Dep.; \$0.30(OTS)	1879	10-320	Dep.; \$12.30 (ph OTS); \$4.50 (mf OTS)
7055	10-1385	Phys. Rev. 101, 1441-2(1956)	1888	10-129	Dep.; \$12.30 (ph OTS); \$4.50 (mf OTS)
7075	10-184	Dep.; \$1.80 (ph OTS); \$1.80 (mf OTS)	1892	10-1459	Dep.; \$0.45(OTS)
7080	10-3012	Dep.; \$0.25(OTS)	1897	10-942	Dep.; \$0.30(OTS)
7129	10-2669	J. Am. Chem. Soc. 77, 6519-21(1955)	1900	10-105	Dep.; \$0.15 (OTS)
7135	10-1015	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	1907	10-1292	Dep.; \$0.25(OTS)
7137	10-1594	Phys. Rev. 100, 940-2(1955)	1913	10-1519	Dep.; \$0.25(OTS)
7165	10-925	J. Franklin Inst. 261, 373-6(1956)	1928	10-244	Dep.; \$6.30 (ph OTS); \$3.00 (mf OTS)
7173	10-1781	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)	1929	10-1466	Dep.; \$0.30(OTS)
7175	10-3189	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	1930	10-721	Dep.; \$7.80(ph OTS); \$3.30(mf OTS)
7214	10-1216	Dep.; \$0.20(OTS)	1932	10-612	Dep.; \$0.25(OTS)
7283	10-70	J. Phys. Chem. 59, 1074-6(1955)	1933	10-130	Dep.; \$6.30 (ph OTS); \$3.00 (mf OTS)
7298	10-3133	\$4.80(ph OTS); \$2.70(mf OTS)	1942	10-43	Dep.; \$6.30 (ph OTS); \$3.00 (mf OTS)
7322	10-2160	Phys. Rev. 100, 1409-14(1955)	1945	10-3035	Dep.; \$13.80(ph OTS); \$4.80(mf OTS)
7323	10-2104	Rev. Sci. Instr. 26, 112-19(1955)	1950	10-82	Dep.; \$3.30 (ph OTS); \$2.40 (mf OTS)
7326	10-1605	Phys. Rev. 100, 945-6(1955)	1951	10-1240	Dep.; \$0.20(OTS)
7377	10-655	J. Chem. Phys. 23, 1961-2(1955)	1952	10-1293	Dep.; \$0.30(OTS)
7379	10-1944	Dep.; \$0.15(OTS)	1953	10-1168	Dep.(mc); \$22.80(ph OTS); \$7.20(mf OTS)
7455	10-1003	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	1957	10-210	Dep.; \$4.80 (ph OTS); \$2.70 (mf OTS)
7472	10-2769	Phys. Rev. 100, 1627-9(1955)	1958	10-1498	J. Nuclear Energy 2, 153-67(1956)
7477	10-1386	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1966	10-1328	Dep.; \$0.20(OTS)
7482	10-3199	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	1972	10-489	Dep.; \$3.30 (ph OTS); \$2.40 (mf OTS)
7485	10-3369	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	1975	10-3144	Dep.(mc); \$18.30(ph OTS); \$6.00(mf OTS)
7597	10-3271	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1983	10-2806	Dep.; \$12.30(ph OTS); \$4.50(mf OTS)
7638	10-3187	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)			

Report	Abstract	Availability	Report	Abstract	Availability
ORNL			RL		
1987	10-1927	Dep.; \$0.60(OTS)	28.5.117	10-3662	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1989	10-2685	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)	28.5.120	10-2451	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1992	10-1642	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	28.5.121	10-2452	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
1997	10-3023	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	28.5.135	10-2241	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2006	10-3176	Anal. Chem. <u>28</u> , 1049-51(1956)	28.5.139	10-2453	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2013	10-2816	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)	28.5.144	10-2454	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2019	10-3880	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	28.5.146	10-2493	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2025	10-3186	Dep.; \$0.25(OTS)	55-RL-1405	10-188	See SO-2523
2026	10-3186	Dep.; \$0.25(OTS)	56-RL-1495	10-3134	See SO-2044
2028	10-3026	Dep.; \$10.80(ph OTS); \$3.90(mf OTS)	56-RL-1521	10-3286	See SO-2045
2031	10-3350	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	55-RL-1530	10-3821	See SO-2046
2034	10-3186	Dep.; \$0.25(OTS)	RM		
2035	10-3798	Dep.; \$0.20(OTS)	1412-AEC		See AECU-3102
2037	10-3211	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	1556-AEC	10-1129	See AECU-3111
2040	10-3177	Dep.; \$0.20(OTS)	1578-AEC	10-1836	See AECU-3125
2047	10-3317	Dep.; \$0.30(OTS)	RME		
2048	10-3282	pp.71-94 of "Nuclear Metallurgy—A Symposium on Behaviour of Materials in Reactor Environment, February 20, 1956." IMD Special Report Series No. 2. New York, American Inst. of Mining and Metallurgical Engineers, Inc., 1956. 94p. \$3.75.	51	10-796	Dep.; \$0.20(OTS)
2050	10-3212	Dep.; \$0.15(OTS)	58(Pt.I)	10-1350	Dep.; \$0.25(OTS)
2059	10-3268	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	73	10-797	Dep.; \$0.15(OTS)
2060	10-3768	Dep.(mc); \$10.80(ph OTS); \$3.90(mf OTS)	75(Pt.1)	10-798	Dep.; \$0.25(OTS)
ORO			76(Pt.1)	10-799	Dep.; \$0.20(OTS)
125	10-3773	Dep.; \$5.50(GPO)	77(Pt.1)	10-800	Dep.; \$0.20(OTS)
136	10-83	Dep.; \$0.15 (OTS)	79	10-2063	Dep.; \$0.20(OTS)
139	10-763	Dep.; \$1.00(OTS)	80(Pt.I)	10-1351	Dep.; \$0.20(OTS)
143	10-2062	Dep.; \$0.15(OTS)	1044	10-1352	Dep.; \$0.20(OTS)
145	10-1169	Dep.; \$0.65(OTS)	1049	10-148	Dep.; \$0.15 (OTS)
146	10-580	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	1059	10-801	Dep.; \$0.20(OTS)
148	10-3341	Dep.; \$0.25(OTS)	2015	10-1784	Dep.; \$0.20(OTS)
150	10-3769	Dep.; \$0.65(OTS)	2021	10-802	Dep.; \$0.15(OTS)
R			2023	10-1353	Dep.; \$0.25(OTS)
52GL51	10-2405	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	2024	10-1354	Dep.; \$0.15(OTS)
116	10-3032	See NEVIS-16	2027	10-803	Dep.; \$0.15(OTS)
MEF			2032(Pt.1)	10-1355	Dep.; \$0.20(OTS)
55	10-3290	Dep.; \$0.20(OTS)	3105	10-1356	Dep.; \$0.45(OTS)
RL			3106	10-149	Dep.; \$0.50 (OTS)
4.6.151	10-3495	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3107	10-2064	Dep.; \$0.25(OTS)
4.6.231	10-3565	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3110(Pt.1)	10-150	Dep.; \$7.80 (ph OTS); \$3.30 (mf OTS)
4.6.260	10-2393	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	3110(Pt.III)	10-1785	Dep.; \$0.70(OTS)
4.6.265	10-2394	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3112	10-1357	Dep.; \$0.25(OTS)
4.6.271	10-3640	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3113	10-804	Dep.; \$0.20(OTS)
4.6.321	10-2395	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	3116	10-805	Dep.; \$0.25(OTS)
12.6.17	10-1287	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3119	10-1358	Dep.; \$0.55(OTS)
16.6.49	10-3750	Dep.(mc); \$13.80(ph OTS); \$4.80(mf OTS)	3125	10-3130	Dep.; \$0.20(OTS)
28.5.109	10-2498	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	4054	10-806	Dep.; \$0.25(OTS)
28.5.114	10-2547	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	RMO		
			2021	10-65	Dep.; \$1.80 (ph OTS); \$1.80 (mf OTS)
			2032	10-1294	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)



Report	Abstract	Availability	Report	Abstract	Availability
RMO			SEP		
2037	10-1295	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	149	10-3013	Dep.; \$0.30(OTS)
2038	10-1296	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	184	10-854	Dep.; \$0.25(OTS)
2039	10-1297	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	SO		
2041	10-3113	Dep.; \$0.40(OTS)	2043	10-996	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2501	10-2991	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	2044	10-3134	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2502	10-722	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	2045	10-3286	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2503	10-723	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	2046	10-3821	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
2504	10-724	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	2523	10-188	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
2505	10-107	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	3000	10-3613	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
2506	10-2015	Dep.; \$0.20(OTS)	3005	10-3614	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
2507	10-2686	Dep.; \$0.15(OTS)	Spec.		
2508	10-2035	Dep.; \$0.15(OTS)	49	10-3750	See RL-16.6.49
2509	10-2617	Dep.; \$0.20(OTS)	5K		
2510	10-3114	Dep.; \$0.20(OTS)	119	10-2797	See AECD-3726
2512	10-3115	Dep.; \$0.20(OTS)	SUI		
2516	10-1787	Dep.; \$0.20(OTS)	55-9	10-2097	Phys. Rev. <u>100</u> , 1460-7(1955)
2517	10-2992	Dep.; \$0.25(OTS)	TEI		
2518	10-3342	Dep.; \$0.30(OTS)	336A	10-151	Dep.; \$0.20(OTS)
2519	10-2664	Dep.; \$0.20(OTS)	380	10-161	U. S. Geol. Survey Bull. <u>1021-C</u> (1955); (GPO)
2520	10-2687	Dep.; \$0.20(OTS)	455	10-1786	Am. Mineralogist <u>40</u> , 1004-21(1955)
2522	10-2688	Dep.; \$0.20(OTS)	453	10-2065	Dep.; \$0.35(OTS)
2523	10-2689	Dep.; \$0.20(OTS)	472	10-821	Econ. Geol. <u>50</u> , 447-58(1955)
2525	10-2690	Dep.; \$0.20(OTS)	479	10-152	Dep.; \$0.30(OTS)
2526	10-2036	Dep.; \$0.15(OTS)	507	10-2066	Dep.; \$0.30(OTS)
2527	10-2037	Dep.; \$0.25(OTS)	525	10-3192	Dep.; \$0.25(OTS)
2530	10-3343	Dep.; \$0.25(OTS)	540	10-2067	Dep.; \$1.50(OTS)
2531	10-3277	Dep.; \$0.15(OTS)	TEM		
2532	10-2665	Dep.; \$0.30(OTS)	645	10-160	U. S. Geol. Survey Bull. <u>1009-H</u> (1955); \$0.40 (GPO)
2607	10-725	Dep.; \$0.25(OTS)	693	10-157	Available from U. S. Geol. Survey, as Geologic Quadrangle Map GQ-61
2611	10-2038	Dep.; \$0.30(OTS)	695	10-158	Available from U. S. Geol. Survey, as Geologic Quadrangle Map GQ-68
2612	10-1298	Dep.; \$0.20(OTS)	696	10-1359	Available from U. S. Geol. Survey, as Geological Quadrangle Map GQ-55
2616	10-1321	Dep.; \$0.50(OTS)	697	10-154	Available from U. S. Geol. Survey, as Geologic Quadrangle Map GQ-59
2617	10-1299	Dep.; \$0.25(OTS)	698	10-155	Available from U. S. Geol. Survey, as Geologic Quadrangle Map GQ-69
2709	10-2259	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	700	10-156	Available from U. S. Geol. Survey, as Geologic Quadrangle Map GQ-66
2710	10-2260	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	874-A	10-3007	Dep.; \$0.20(OTS)
2715	10-2261	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	917	10-153	Dep.; \$0.15(OTS)
2716	10-2262	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	TID		
2719	10-2263	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3010(Suppl.2)	10-2726	Dep.; \$0.30(OTS)
2720	10-2264	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3043(Suppl.2)	10-2727	Dep.; \$0.25(OTS)
2722	10-2265	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3044(Suppl.1)		Dep.; \$1.50(OTS)
2724	10-2266	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3063	10-3053	Dep.; \$0.35(OTS)
2726	10-3418	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	5047	10-3231	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
4000	10-1300	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)			
4002	10-1301	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)			
SEP					
54	10-3818	Dep.; \$0.20(OTS)			
91	10-3819	Dep.; \$0.15(OTS)			
113	10-1815	Dep.; \$0.30(OTS)			
123	10-1816	Dep.; \$0.25(OTS)			
127	10-3362	Dep.; \$0.30(OTS)			

Report	Abstract	Availability	Report	Abstract	Availability
TID			UCLA		
5048	10-3731	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	352	10-509	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
5050	10-3232	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	353	10-2993	Dep.; \$0.20(OTS)
5051	10-3233	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	354	10-3834	Dep.; \$0.25(OTS)
5054	10-3042	Dep.; \$0.35(OTS)	355	10-1153	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
5055	10-3213	Dep.; \$0.15(OTS)	356	10-2671	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
5057	10-3234	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	359	10-2967	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
5077	10-3378	Dep.; \$0.25(OTS)	360	10-3184	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
5116	10-3363	Dep.; \$1.00(OTS)	361	10-3328	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
5117	10-885	Dep.; \$0.25(OTS)	363	10-3770	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
5140	10-3188	Dep.; \$0.25(OTS)	364	10-3776	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
5184	10-3014	Dep.; \$0.60(OTS)	365	10-3881	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
5212	10-1817	Dep.; \$1.00(OTS)	UCRL		
5213	10-3162	Dep.; \$1.15(OTS)	78	10-2353	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
5214	10-3140	Dep.; \$2.65(OTS)	96	10-2499	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
5215	10-926	Dep.; \$1.45(OTS)	111	10-2488	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
5216	10-927	Dep.; \$1.85(OTS)	114	10-2551	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
5217	10-1863	Dep.; \$2.65(OTS)	116	10-3663	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)
5218	10-938	Dep.; \$1.85(OTS)	126	10-2332	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
5219	10-3210	Dep.; \$1.50(OTS)	130	10-3664	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
5259	10-613	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	132	10-2500	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
5280(Suppl. 1)	10-2024	Dep.; \$0.60(OTS)	139	10-2501	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
5392	10-2168	Dep.; \$0.45(OTS)	140	10-2502	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
5300	10-1520	Dep.; \$1.75(GPO)	184	10-2466	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
7001	10-1928	Dep.; \$2.45(OTS)	196	10-3566	Dep.(mc); \$12.30(ph OTS); \$4.50(mf OTS)
7004	10-3318	\$2.10(OTS)	225	10-2354	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
7508	10-3790	Dep.; \$0.40(OTS)	633	10-2344	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
8001	10-1170	Dep.; \$0.15(OTS)	764	10-2333	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
8002	10-2579	Dep.; \$0.20(OTS)	861	10-3496	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
8003	10-3043	Dep.; \$0.20	1173	10-1584	Dep.(mc); \$28.80(ph OTS); \$8.40(mf OTS)
8004	10-3128	Dep.; \$0.15(OTS)	1280	10-2503	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)
8005	10-3179	Dep.; \$0.15(OTS)	1294	10-2334	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
8006	10-3301	Dep.; \$0.20	2179(Suppl.)	10-2461	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
8007	10-3256	Dep.; \$0.15(OTS)	2589	10-1207	J. Am. Chem. Soc. <u>77</u> , 5948-57(1955)
8008	10-3169	Dep.; \$0.15(OTS)	2672	10-1585	Dep.; \$0.50(OTS)
8009	10-3235	Nucleonics <u>14</u> , No. 3, 45-7(1956)	2674	10-726	Dep.; \$0.15(OTS)
8010	10-3876	Dep.; \$0.45(OTS)	2755	10-2031	J. Chem. Phys. <u>23</u> , 1750-6(1955)
UCLA			2797	10-1869	J. Chem. Phys. <u>23</u> , 1629-30(1955)
33	10-3351	Dep.; \$0.25(OTS)	2808	10-1090	Dep.; \$0.45(OTS)
330	10-956	Am. J. Roentgenol. Radium Therapy Nuclear Med. <u>75</u> , 1169-73(1956); Dep.; \$0.20(OTS)	2816	10-2768	J. Chem. Phys. <u>23</u> , 1826-9(1955)
322	10-1693	Dep.; \$0.25(OTS)	2854(Rev.)	10-1896	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)
337	10-2973	J. Biol. Chem. <u>218</u> , 911-19(1956)	2879	10-1859	Dep.; \$0.35(OTS)
343	10-581	Dep.; \$0.20(OTS)	2884	10-1130	Dep.; \$45.00(ph OTS); \$11.10(mf OTS)
344	10-1329	Dep.; \$0.15(OTS)	2923	10-261	Rev. Sci. Instr. <u>26</u> , 954-8(1955)
349	10-2	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	2949	10-1862	Electronics <u>28</u> , No. 11, 218-220(1955)
347	10-507	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	2960	10-454	Phys. Rev. <u>100</u> , 137-42(1955)
348	10-517	Dep.(mc); OTS \$4.80(ph OTS); \$2.70(mf OTS)	2969	10-496	Phys. Rev. <u>100</u> , 372-5(1955)
349	10-554	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	2980	10-2206	Phys. Rev. <u>100</u> , 1403-6(1955)
350	10-555	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)			
351	10-508	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)			

Report	Abstract	Availability	Report	Abstract	Availability
UCRL			UCRL		
2982	10-1632	Phys. Rev. <u>100</u> , 905-11(1955)	3228	10-2572	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)
2991	10-1524	Phys. Rev. <u>100</u> , 844(1955)	3236	10-3239	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
3033	10-1081	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	3237	10-3206	Dep.; \$0.15(OTS)
3034	10-494	Phys. Rev. <u>100</u> , 240-1(1955)	3240	10-3104	Dep.; \$0.50(OTS)
3041	10-285	Nuovo cimento (10), <u>2</u> , 344-5(1955)	3242	10-3098	Dep.; \$0.25(OTS)
3053	10-2191	Phys. Rev. <u>100</u> , 1445-7(1955)	3247	10-3164	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)
3054	10-1126	J. Chem. Phys. <u>23</u> , 1956-7(1955)	3250	10-3240	Dep.; \$0.30(OTS)
3072	10-1217	Dep.; \$0.20(OTS)	3259	10-3878	Dep.(mc); \$0.50(OTS)
3083	10-283	Phys. Rev. <u>100</u> , 430-1(1955)	3265	10-3791	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)
3084	10-1447	Dep.; \$0.15(OTS)	3266	10-3246	Dep.; \$0.35(OTS)
3094	10-1467	Dep.; \$0.55(OTS)	3268	10-3165	Dep.; \$0.40(OTS)
3098	10-490	Dep.; \$19.80 (ph OTS); \$6.30 (mf OTS)	3271	10-3215	Dep.; \$0.15(OTS)
3101	10-2185	Science <u>122</u> , 1127-32(1955)	3273	10-3241	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)
3115	10-1009	Dep.; \$9.30(ph OTS); \$3.60(mf OTS)	3274	10-3303	Dep.; \$12.30(ph OTS); \$4.50(mf OTS)
3132	10-582	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	3275	10-3846	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
3135	10-787	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	3281	10-3320	Dep.; \$10.80(ph OTS); \$3.90(mf OTS)
3136	10-919	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	3284	10-3847	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
3138	10-222	Dep.; \$0.20(OTS)	3288	10-3207	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
3141	10-1154	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	3289	10-3848	Dep.; \$0.15(OTS)
3144	10-583	Dep.; \$0.20(OTS)	3291	10-3304	Dep.; \$0.20(OTS)
3145	10-3	Proc. Soc. Exptl. Biol. Med. <u>90</u> , 463-6 (1955)	3294	10-3308	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
3150	10-1586	Dep.; \$0.20(OTS)	3295	10-3305	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)
3153	10-1082	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	3314	10-3216	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)
3154	10-1448	Dep.; \$12.30(ph OTS); \$4.50(mf OTS)	3317	10-3272	Dep.; \$0.15(OTS)
3156	10-979	Nuovo cimento (10) <u>3</u> , 85-93(1956)	3324	10-3792	Dep.; \$0.15(OTS)
3157	10-1729	Dep.; \$0.50(OTS)	3326	10-3854	Dep.; \$0.30(OTS)
3169	10-629	Dep.; \$0.20(OTS)	3328	10-3772	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
3172	10-1510	Phys. Rev. <u>100</u> , 947-50(1955)	3256	10-2173	Dep.; \$0.25(OTS)
3173	10-3204	Dep.; \$0.25(OTS)	4454	10-382	Dep.; \$1.80 (ph OTS); \$1.80 (mf OTS)
3176	10-1948	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	4505	10-2239	Phys. Rev. <u>100</u> , 1284-6(1955)
3178	10-1218	Dep.; \$0.15(OTS)	4506	10-2240	Phys. Rev. <u>100</u> , 1286-93(1955)
3179	10-1468	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	4516	10-1872	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
3184	10-3045	Dep.; \$0.25(OTS)	4526	10-1125	J. Chem. Phys. <u>23</u> , 1956(1955)
3185	10-1939	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)	4531	10-893	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)
3187	10-1587	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	4540	10-943	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
3190	10-2639	Dep.; \$0.35(OTS)	4547	10-236	Dep.; \$0.20 (OTS)
3191	10-1694	Dep.; \$0.25(OTS)	4557	10-910	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
3195	10-3205	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	4559	10-928	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
3203	10-2571	Dep.; \$0.25(OTS)	4560	10-1853	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3208	10-1696	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)	4603	10-1412	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
3209	10-3116	Dep.; \$10.80(ph OTS); \$3.90(mf OTS)	4588	10-3225	Dep.; \$0.25(OTS)
3210	10-3031	Dep.; \$0.15(OTS)	4622	10-3236	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
3211	10-3047	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	4628	10-3137	Dep.; \$0.15(OTS)
3212	10-2181	Dep.; \$0.25(OTS)	4629	10-3287	Dep.; \$0.15(OTS)
3213	10-2628	Dep.; \$12.30(ph OTS); \$4.50(mf OTS)	4641	10-3221	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)
3215	10-2103	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	UCRL-Trans		
3218	10-3046	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)	342	10-336	LC
3223	10-3222	Dep.; \$7.80(ph OTS); \$3.30(mf OTS)	343	10-277	JCL
			348	10-1509	LC
			349	10-1821	LC



Report	Abstract	Availability	Report	Abstract	Availability
UCRL-Trans			WAPD-MM		
253	10-2949	LC	538	10-3616	See AECD-3864
IN7	10-3036	LC			
UCSF			WAPD-SFR-Fe		
12	10-3166	Dep.; \$10.80(ph OTS); \$3.90(mf OTS)	192	10-1823	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
UR			WAPD-T		
295	10-1983	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)	20	10-3015	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
296	10-19	Dep.; \$3.30 (ph OTS); \$2.40 (mf OTS)	38 and Suppl.	10-3139	Dep.; \$0.40(OTS)
302	10-1776	Dep.; \$16.80(ph OTS); \$5.70(mf OTS)	WAPD-TN		
305	10-614	Dep.; \$13.80(ph OTS); \$4.80(mf OTS)	520	10-3237	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
321	10-957	Dep.; \$0.60(OTS)	521	10-195	Dep.(mc); \$6.30 (ph OTS); \$3.00 (mf OTS)
327	10-545	Dep.; \$18.30(ph OTS); \$6.00(mf OTS)	522	10-1562	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
359	10-2243	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	524	10-3372	Dep.; \$0.25(OTS)
403	10-20	Brit. J. Radiol. 29, 169-71(1956)			
404	10-4	Dep.; \$7.80 (ph OTS); \$3.30 (mf OTS)	WASH		
411	10-548	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	275	10-2610	Dep.; \$1.50(OTS)
414	10-556	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	291(Pt-1)	10-3029	Dep.; \$1.00(OTS)
415	10-1982	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)	292(Pt.3, Suppl.1)	10-1563	Dep.; \$0.20(OTS)
416	10-3257	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	WIAP-M		
417	10-3097	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	18	10-3249	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)
418	10-1984	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)			
421	10-3099	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	WIN		
422	10-3096	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	2	10-3273	Dep.; \$0.30(OTS)
423	10-3092	Dep.; \$33.30(ph OTS); \$9.60(mf OTS)	3	10-1322	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
426	10-2974	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	5	10-1323	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
427	10-3258	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	6	10-66	Dep.(mc); \$6.30 (ph OTS); \$3.00 (mf OTS)
428	10-3100	J. Gen. Physiol. 39, 625-49(1956); Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	11	10-3799	Dep.; \$0.20(OTS)
429	10-3259	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	12	10-1302	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
430	10-3168	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)	13	10-727	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
431	10-3260	Dep.; \$1.80(ph OTS); \$1.80(mf OTS)	17	10-3344	Dep.; \$0.25(OTS)
433	10-3253	Dep.; \$6.30(ph OTS); \$3.00(mf OTS)	18	10-1303	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
434	10-3255	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)	23	10-67	Dep.(mc); \$6.30 (ph OTS); \$3.00 (mf OTS)
440	10-3771	Dep.; \$3.30(ph OTS); \$2.40(mf OTS)	24	10-728	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
WAPD			25	10-587	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
21	10-2467	Dep.(mc); \$24.30(ph OTS); \$7.50(mf OTS)	Y		
25	10-1399		1	10-2455	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
76	10-781	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	27	10-2477	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
77	10-2194	Dep.; \$0.20(OTS)	32	10-2478	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
79	10-2918	Dep.; \$0.25(OTS)	42	10-2570	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
84	10-3615	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	63	10-3567	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
128	10-3151	Dep.; \$0.25(OTS)	87	10-3568	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
129	10-2084	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	112	10-3569	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
131	10-1822	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)	149	10-3473	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
134	10-3403	Dep.; \$0.60(OTS)	161	10-3570	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
146	10-3839	Dep.; \$0.25(OTS)	164	10-3625	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
WAPD-CE			184	10-3571	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
41	10-3877	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)			

Report	Abstract	Availability	Report	Abstract	Availability
Y			Y		
228	10-3626	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	553	10-3135	Dep.; \$0.20(OTS)
242	10-2473	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	559	10-3793	Dep.; \$0.25(OTS)
243	10-2479	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	560	10-3274	Dep.; \$0.40(OTS)
253	10-2335	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	563	10-2476	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
286	10-3572	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	573	10-3200	Dep.; \$0.15(OTS)
287	10-3627	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	589	10-3278	Dep.; \$0.25(OTS)
299	10-3628	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	602	10-3461	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)
315	10-3573	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	611	10-2996	Dep.; \$0.20(OTS)
321	10-2460	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	612	10-3794	Dep.; \$0.25(OTS)
328	10-2336	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	652	10-3632	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
352	10-3629	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	655	10-3633	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)
353	10-3630	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	817	10-3820	Dep.; \$0.30(OTS)
381	10-3574	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	824	10-3016	Dep.; \$0.25(OTS)
389	10-3737	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	883	10-615	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)
390	10-3459	Dep.(mc); \$9.30(ph OTS); \$3.60(mf OTS)	1052	10-2736	Dep.; \$0.20(OTS)
407	10-3460	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	1087	10-2046	Dep.; \$0.20(OTS)
409	10-3575	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	1095	10-616	Dep.; \$4.80(ph OTS); \$2.70(mf OTS)
411	10-2474	Dep.(mc); \$7.80(ph OTS); \$2.30(mf OTS)	1096	10-84	Dep.; \$0.15 (OTS)
414	10-3600	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	1114	10-3027	Dep.; \$0.25(OTS)
431	10-3182	Dep.; \$0.25(OTS)			
449	10-2994	Dep.; \$0.15(OTS)	Y-B		
462	10-2287	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)	58-1	10-3581	See AECD-3901
463	10-2337	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)			
471	10-3580	Dep.(mc); \$1.80(ph OTS); \$1.80(mf OTS)	Y-F		
475	10-2268	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	10-112	10-3665	See AECD-3994
477	10-2995	Dep.; \$0.30(OTS)			
478	10-3576	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)			
544	10-3631	Dep.(mc); \$3.30(ph OTS); \$2.40(mf OTS)	Z		
545	10-2475	Dep.(mc); \$4.80(ph OTS); \$2.70(mf OTS)	12	10-3686	See CF-46-6-23

## PART II

ACSIL/ADM (British)			AD (Non-AEC)		
50/249	10-1838	See ARL/R3/E800	39616	10-883	
			<del>39638</del>	10-825	
			<del>39641</del>	10-559	
AD (Non-AEC)			40079	10-875	See TIB/T4119
2178	10-2731	See WADC-TR-52-289	40762	10-784	
13795	10-563	See BM-3289	40932	10-760	
28714	10-756		41197	10-826	
33351	10-584	See WADC-TR-52-5(Suppl.2)	41212	10-186	See PIBAL-254
35659	10-823		41213	10-185	See PIBAL-252
36320	10-2069		41565	10-842	See NETL-T-R-89
36901	10-2732	See WADC-TR-53-510(Pt.1)	41807	10-318	
37021	10-2613	See ERI-1966-1-P	43730	10-172	
37256	10-141		45691	10-2700	See WADC-TR-54-194
37474	10-836	See CAL-KA-797-M-10	<del>46277</del>	10-1752	
37740	10-824		49021	10-191	See WADC-TR-53-477
37749	10-1099		<del>50071</del>	10-790	See WADC-TR-54-38
38637	10-124				
39372	10-187	See S and T Memo-8/54			

Report	Abstract	Availability	Report	Abstract	Availability
AD (Non-AEC)			AERE-CE/R (British)		
50566	10-764	See WADC-TR-54-66	1730	10-1271	\$1.00
51791	10-2735	See WCRT-TN-54-51	AERE-E/R (British)		
53854	10-1268	See WADC-TR-53-457	173	10-126	\$0.90
58607	10-132	See WADC-TR-53-288(Pt.6)	AERE-EL/M (British)		
59634	10-874	See T-146-R	92	10-946	\$0.65
59789	10-827		AERE-EL/R (British)		
59791	10-53		1507	10-249	
59979	10-785		1555	10-2197	Brit. J. Appl. Phys. <u>6</u> , 444-9(1955)
62227	10-572	See JPL-PR-20-219	1676	10-921	
62517	10-2782		AERE-GP/M (British)		
63502	10-1392	See WADC-TR-53-190(Pt.3)	182	10-761	
63615	10-894	See WADC-TR-54-38(Pt.2)	AERE-GP/R (British)		
63962	10-1395	See WADC-TR-54-588	1613	10-1074	
66412	10-828		1742	10-1582	Dep.
66441	10-585	See WADC-TR-52-5(Suppl.3)	1748	10-2903	
67096	10-2693		AERE-HP/M (British)		
68680	10-2713		95	10-110	Atomica <u>6</u> , 312-20(1955)
69092	10-2766		AERE-I/R (British)		
AECL (Canadian)			1369	10-143	J. Sci. Instr. <u>32</u> , 394-8(1955)
163	10-628	See CRE-374	AERE-INF/Bib (British)		
219	10-339	Can. J. Phys. <u>33</u> , 607-8(1955)	93(3rd Ed.)	10-2699	Dep.
230	10-202	See CRCE-608	AERE-Lib/Trans (British)		
232	10-375	See DR-32	443	10-205	
235	10-1769	Can. J. Chem. <u>33</u> , 1775-9(1955)	489	10-1432	
236	10-1770	Can. J. Chem. <u>33</u> , 1780-91(1955)	521	10-2009	Dep.
240	10-2882	\$1.00	528	10-1244	Dep.
241	10-1411	See PR-P-27	533	10-2771	
242	10-504		547	10-1433	Dep.
243	10-1949	Can. J. Phys. <u>33</u> , 886-8(1955)	548	10-334	
252	10-1551	See DL-20	555	10-2707	
254	10-505	\$0.25	557	10-230	
255	10-1852	Can. J. Phys. <u>33</u> , 889-91(1955)	559	10-1978	
257	10-2898	Can. J. Phys. <u>34</u> , 20-3(1956)	563	10-196	
259	10-1923	\$0.25	564	10-1434	Dep.
262	10-2870	Can. J. Phys. <u>34</u> , 147(1956)	567	10-2711	Dep.
263	10-1977	See DL-21	569	10-335	
265	10-2164	See DL-19	570	10-1521	Dep.
AERE-C/M (British)			575	10-422	
280	10-2643	Dep.	579	10-1338	Dep.
AERE-C/R (British)			582	10-1590	Dep.
1502	10-2926	Dep.	585	10-2227	Dep.
1637	10-605		587	10-2818	Dep.
1646	10-248	\$1.15	588	10-2819	Dep.
1699	10-458	J. Inorg. and Nuclear Chem. <u>1</u> , 241-7(1955)	591	10-2694	
1709	10-500	J. Inorg. and Nuclear Chem. <u>1</u> , 248-52(1955)	599	10-276	
1715	10-1547	\$3.50	601	10-1152	
1725	10-1232	Dep.; \$0.05			
1735	10-1256	Dep.			
1749	10-1233	\$0.90			
1757	10-2650				



Report	Abstract	Availability	Report	Abstract	Availability
AERE-Lib/Trans (British)			ANL-GRH		
606	10-2692	Dep.	16	10-2648	See AECU-3142
610	10-2908	Dep.	ARC (British)		
617	10-2049	Dep.	1951	10-785	See AD-59979
621	10-2772	Dep.	ARL/R (British)		
625	10-2943	Dep.	3/E600	10-1838	
629	10-2802	Dep.	ATC (Non-AEC)		
1484	10-1156		54-12	10-1150	
AERE-M/M (British)			ATI (Non-AEC)		
99	10-830		156652	10-584	See WADC-TR-52-5 and WADC-TR-52-5 (Suppl.1)
AERE-M/R (British)			52341	10-174	
649	10-776		63671	10-145	See BIOS-FR-896
AERE-NP/R (British)			203413	10-1366	
1720	10-250	\$0.90	AWRE (British)		
AERE-RP/R (British)			0-12/55	10-1754	
1447	10-1064	J. Nuclear Energy <u>2</u> , 52-8(1955)	AWRE-O (British)		
AERE-RS-L (British)			14/55	10-1234	
3	10-2187	\$0.75	20/55	10-1462	
AERE-T/M (British)			BAC		
128	10-1075	Dep.	02-978-010	10-127	
AERE-T/R (British)			BIOS-FR (British)		
1367	10-947		55	10-145	
1617(Del.)	10-1086		BM		
1718	10-2051	Proc. Roy. Soc. (London) <u>A233</u> , 367-76 (1955) (Condensed)	1289	10-563	
AERE-X/R (British)			BM-IC (Non-AEC)		
1771	10-1583	Dep.	7725	10-1616	
AF-SAM (Non-AEC)			BM-RI (Non-Project)		
55-45	10-1717		5141	10-175	
55-94	10-1173	Arch. Ophthalmol. <u>54</u> , 863-74(1955)	5168	10-607	
AF-TR (Non-AEC)			5170	10-1808	
6519(Pt.IV)	10-1347		BWR (British)		
AFSWP (Non-AEC)			5	10-1031	
798	10-1097	See USNRDL-453	CAL-KA (Non-AEC)		
905	10-1846	See USNRDL-TR-61	797-M-10	10-835	
AGC (Non-AEC)			CCC (Non-AEC)		
1229-5	10-54		1024-TR-107	10-232	
1229-6	10-2670		1024-TR-136	10-56	
AMRL (Non-AEC)			1024-TR-139	10-57	
206	10-41		1024-TR-140	10-58	
			1024-TR-141	10-59	

Report	Abstract	Availability	Report	Abstract	Availability
CCC (Non-AEC)			CRRP (Canadian)		
1024-TR-142	10-118		1024-TR-143	10-60	
1024-TR-147	10-564		CU (Misc.)		
1024-TR-148	10-565		2-55-ORD-1420-Met.	10-867	See WAL-401/149-20
1024-TR-150	10-1210		DL (Canadian)		
1024-TR-152	10-1211		10	10-2164	\$1.00
1024-TR-157	10-1212		20	10-1551	\$0.25
1024-TR-162	10-2611		21	10-1977	\$0.50
1024-TR-163	10-2612		DR (Non-AEC)		
CERN (European)			1024-TR-163	10-375	
55-18	10-201		EES (Non-AEC)		
55-23	10-411	Nuovo cimento (10) 2, Suppl. 1, 375-91 (1955)	4C(8)17X1603	10-1809	
55-24	10-412	Nuovo cimento (10) 2, Suppl. 1, 392-402 (1955)	ERI (Non-AEC)		
55-27	10-1541	Kgl. Danske Videnskab. Selskab, Mat.-Fys. Medd. 29, No. 19, 1955.	1943-4-41-T	10-2025	See AECU-3077
55-28	10-1515	Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 1, 1955. 24p.	1943-7-51-P	10-1162	See COO-210
55-30	10-1514	Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 29, No. 16, 1955. 69p.	1966-1-P	10-2613	
56-3	10-366	Phys. Rev. 100, 432-3(1955)	2189-1-T	10-484	See OGR-TN-55-184
CERN-PS/A-SCH (European)			FSE		
2	10-2179		9-007	10-2895	See NARF-55-83T
43	10-1935		G		
CERN-PS/ER (European)			17-55	10-1366	See ATI-203413
42	10-407		GEAP		
CERN-PS/FG (European)			0500	10-2717	
2	10-408		IGC-XMPDC/P (British)		
CERN-PS/LRF (European)			12	10-1371	See IGR-TN/C-250
1	10-233		IGC-XMWP/P (British)		
CERN-PS/MM (European)			11	10-1371	See IGR-TN/C-250
21	10-1076		IGR-R/R (British)		
20	10-409		151	10-1055	
22	10-1077		IGR-TN/C (British)		
CERN-PS/PL (European)			250	10-1371	
3	10-1078		JENER (Norwegian)		
CERN-PS/RGB (European)			37	10-2167	
8	10-522		1024-TR-163	10-1319	
CERN-PS/RH (European)			JPL-PR (Non-AEC)		
9	10-1422		20-219	10-572	
CRCE (Canadian)			KLO		
608	10-202		132	10-3123	See K-434
CRE (Canadian)			MAB (Non-AEC)		
374	10-628		101-M	10-177	

Report	Abstract	Availability	Report	Abstract	Availability
MCC (Non-AEC)			NDA (Misc.)		
1023-TR-162	10-573		14-34	10-1558	
1023-TR-164	10-574		14-46	10-1559	
1023-TR-169	10-1721		14-58	10-1560	
1023-TR-170	10-1722		14-71	10-1497	
1023-TR-174	10-1723		14-84	10-1561	
1023-TR-177	10-1724		15C-53	10-312	See NYO-6268
1023-TR-178	10-1725				
ML			NEI (Canadian)		
274	10-1079		51	10-2897	
MLSR (Non-AEC)			NM (Non-AEC)		
30	10-547		006-012.04.74	10-1164	
			006-012.04.81	10-514	
MR-N (Non-AEC)			006-012.04.82	10-16	
30	10-1464	See NARF-55-77T	006.012.05.12	10-1185	
96	10-950	See NARF-55-45T			
100	10-951	See NARF-55-67T	NNES-I		
101	10-1101	See NARF-55-68T	10	10-3140	See TID-5214
104	10-1858	See NARF-55-72T	13	10-3162	See TID-5213
NACA-RM					
E51G12	10-234		NOL-CORONA		
865	10-2075		143	10-2751	
			151	10-2788	
NACA-TM (Non-AEC)			252	10-2752	
1147	10-767				
1377	10-133		NP (AEC File No. for Non-AEC Reports)		
1384	10-873		4859(Suppl. 7)	10-2093	
			4963(Suppl.)	10-953	
NACA-TN (Non-AEC)			5056(Del.)	10-2626	
1495	10-778		5057(Del.)	10-2626	
3552	10-2721		5586	10-1059	
3556	10-2076		5778	10-203	
3800	10-2722		5779	10-120	
			5780	10-84	
NARF (Non-AEC)			5781	10-178	
55-45T	10-950		5783	10-179	
55-67T	10-951		5786	10-251	
55-68T	10-1101		5789	10-180	
55-72T	10-1858		5790	10-181	
55-77T	10-1464		5791	10-221	
55-83T	10-2895		5792	10-17	
			5793	10-18	
NBTL-T-R (Non-AEC)			5794	10-575	
89	10-842		5795	10-795	
			5796	10-786	
NCSC (Non-AEC)			5797	10-762	
108	10-1557		5798	10-843	
109	10-2814		5799	10-737	
124	10-2896		5801	10-954	
			5802	10-844	
NDA (Misc.)					
14	10-332				
14-24	10-1496				



Report	Abstract	Availability	Report	Abstract	Availability
NP (AEC File No. for Non-AEC Reports)			NRC (Canadian)		
5800	10-1116		3787	10-1847	Can. J. Phys. <u>33</u> , 746-56(1955)
5804	10-889		3805	10-2759	Can. J. Phys. <u>34</u> , 1-19(1956)
5806	10-1117		NRL (Non-AEC)		
5807	10-890		4536	10-577	
5809	10-738		4545	10-182	
5810	10-635		4546	10-891	
5811	10-845		4597	10-849	Welding J. (N. Y.) 35, 9s-17s(1956)
5812	10-578		4607	10-2592	
5813	10-846		4608	10-1080	
5815	10-847		4623	10-850	
5816	10-536		4640	10-1088	Phys. Rev. <u>101</u> , 684-8(1956)
5818	10-923		4643	10-1871	
5819	10-783		4650	10-1382	
5820	10-1373		4654	10-1704	Science 123, 619-22(1956)
5822	10-848		4666	10-2146	
5823	10-1166		4673	10-2858	
5824	10-1465		4677	10-2725	
5825	10-1507		4679	10-2627	
5826	10-1374		4680	10-2815	
5827	10-1375		4686	10-2644	
5828	10-1376		NRL-Trans (Non-AEC)		
5829	10-1377		456	10-197	
5830	10-1378		OSR-TN (Non-AEC)		
5832	10-1333		54-305	10-1845	pp.72-9 of "Proceedings of the National Science Foundation Conference on Stellar Atmospheres," held at Indiana Univ. Sept. 30, Oct. 1 and 2, 1954
5833	10-1214		55-184	10-484	
5834	10-1455		55-320	10-1014	See AECU-3104
5835	10-1379		55-447	10-2147	
5836	10-1380		55-479	10-2767	
5837	10-1381		OSR-TR (Non-AEC)		
5838	10-1811		55-23	10-852	
5839	10-1812		PDB (Canadian)		
5840	10-1775		139	10-106	
5841	10-1813		PIBAL (Non-AEC)		
5842	10-1727		252	10-185	
5843	10-1896		254	10-186	
5844	10-2109		PLAC (British)		
5845	10-1840		11	10-2904	
5846	10-2172		PR-P (Canadian)		
5850	10-2078		27	10-1411	
5851	10-2079		PRL (Non-AEC)		
5852	10-2704		5.16	10-892	
5853	10-2019				
5857	10-2055				
5858	10-2080				
5859	10-2757				
5860	10-2758				
5861	10-2616				
5864	10-2723				
5866	10-2724				
5867	10-2789				
NPG					
126	10-1151	Dep.; \$0.45(OTB)			

Report	Abstract	Availability	Report	Abstract	Availability
PWAC (Non-AEC)			TT (Canadian)		
133	10-131		561	10-589	NRC
RDB(R) (British)			571	10-2619	NRC
8150	10-1060		USBM-U (Non-AEC)		
RL			3	10-1390	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
55-1260	10-853		42	10-858	Dep.(mc); \$7.80(ph OTS); \$3.30(mf OTS)
RM (Misc.)			57	10-859	Dep.(mc); \$6.30(ph OTS); \$3.00(mf OTS)
1543(RAND)	10-2783		USNRDL (Non-AEC)		
1551(RAND)	10-1089		450	10-503	
1554	10-2784		453	10-1097	
RSA/ OML (Non-AEC)			USNRDL-TR (Non-AEC)		
2	10-2109	See NP-5844	56	10-21	
S and T Memo (British)			57	10-22	
8/54	10-187		58	10-518	
ST-RDS (Non-AEC)			59	10-537	Cancer Research 16, 258-61(1956)
5	10-954	See NP-5801	60	10-779	
SWP/P (British)			61	10-1846	
21(Del.)	10-1086	See AERE-T/R-1617(Del.)	62	10-1241	
T			64	10-1189	Radiation Research 4, 186-92(1956)
146-R	10-874		65	10-2817	
T18/T (Non-AEC)			66	10-1697	
4119	10-875		WADC-PR		
TML (Non-AEC)			55-1	10-739	
7	10-856		WADC-TR (Non-AEC)		
8	10-1818	J. Metals 8, 35-42(1956)	52-5	10-584	
15	10-189		52-5(Suppl.1)	10-584	
18	10-857		52-5(Suppl.2)	10-584	
19	10-1387		52-5(Suppl.3)	10-585	
20	10-1388		52-291(Pt.111)	10-1391	
21	10-1389		53-4(Suppl.1)	10-190	
22	10-1819		53-190(Pt.3)	10-1392	
24	10-1820		52-197(Pt.5)	10-1750	
25	10-2728		53-287	10-788	
27	10-2729		53-288(Pt.6)	10-132	
TR (Non-AEC)			52-289	10-2731	
132/55	10-1465	See NP-5823	53-308(Pt.II)	10-780	
130/55	10-795	See NP-5795	53-457	10-1268	
TT (Canadian)			53-477	10-191	
554	10-768	NRC	53-510(Pt.I)	10-2732	
556	10-878	NRC	54-33	10-789	
558	10-1132	NRC	54-38	10-790	
560	10-808	NRC	54-38(Pt.2)	10-894	
			54-45	10-860	
			54-66	10-764	
			54-101(Pt.2)	10-861	
			54-185(Pt.II)	10-586	
			54-194	10-2700	

Report	Abstract	Availability	Report	Abstract	Availability
WADC-TR (Non-AEC)			WAL (Non-AEC)		
54-305(Pt.II)	10-1393		401/149-20	10-867	
54-352	10-2790		401/227	10-193	
54-414	10-791		401/237	10-194	
54-485(Pt.II)	10-862		401/241	10-1398	
54-487	10-1394		401/244	10-2734	
54-492	10-863		401/245	10-627	
54-580	10-2645				
54-582	10-142				
54-588	10-1395		WAPD-TN (Misc.)		
54-601	10-929		517(Pt.II)	10-313	
55-5	10-1396				
55-22	10-864		WCRT		
55-23	10-1397		54-51	10-2735	
55-26(Pt.II)	10-1219				
55-90	10-1730		WHC(C)/P (British)		
55-96	10-865		38	10-1060	See RDB(R)/8150
55-102(Pt.2)	10-1780		53	10-1055	See IGR-R/R-151
55-111	10-192	J. Metals 8, 178-84(1956)			
55-112	10-2733				
55-193(Pt.II)	10-2020		WIS-ONR (Non-AEC)		
55-205	10-2083		16	10-245	
55-501	10-2730				
WAL (Non-AEC)			XAC-R		
130/73-1	10-1242		188	10-3530	See AECD-3897
310/90-85	10-1821				



## NEW NUCLEAR DATA

Compiled by the Nuclear Data Group, National Research Council  
Washington 25, D. C.

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Readers: F. Ajzenberg, Boston University; B. Crasemann, University of Oregon; R. W. Fink, University of Arkansas; M. Glaubman, Columbia University; H. Pomerance, Oak Ridge National Laboratory; and J. R. Stehn, Knolls Atomic Power Laboratory.

Table 1. Radioactivity, Levels, Abundances, Moments  
Table 2. Neutron Cross Sections  
Table 3. Ground State Q's  
Table 4. Mass Differences and Ratios

### INTRODUCTION

This issue of Nuclear Science Abstracts contains the 1956 semi-annual list of new nuclear data. Additional summaries will follow in Volume 10, Nos. 18B and 24B. No. 18B will contain a quarterly list and No. 24B the annual cumulation for 1956. The 1952, 1953, 1954, and 1955 annual cumulations are contained in Vol. 6, No. 24B; Vol. 7, No. 24B; Vol. 8, No. 24B; and Vol. 9, No. 24B, respectively. Extra copies for 1952, 1953, and 1954 are exhausted; for 1955 they are obtainable for \$0.60 from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Literature coverage is continuous; beginning in each new list where it ended in the last

Nuclear Data Cards: As the current literature is surveyed, the new nuclear results are first

printed on 3- by 5-inch cards which are collected into sets of about 150 cards each month. Individuals, laboratories, or libraries may subscribe to the card sets directly by applying to the Publications Office, National Research Council, 2101 Constitution Avenue, N. W., Washington 25, D. C. The price, based on actual mechanical costs, is currently \$20 per year domestic and \$30 per year foreign (air mail postage included for foreign but not for domestic subscriptions.)

Nuclear Level Schemes: The first section of a new comprehensive nuclear data table prepared by the Nuclear Data Group was published last fall by the Government Printing Office. The aim of Nuclear Level Schemes is to provide a revision and expansion of Nuclear Data which was

issued in 1950 as Circular 499 of the U. S. National Bureau of Standards. It will be published in five or six sections, each one of which will be issued upon completion. The first section, now available, gives the data for known nuclei with mass numbers between  $A = 40$  and  $A = 92$ , thus covering roughly the elements  $^{20}\text{Ca}$  through  $^{40}\text{Zr}$ . The second section will summarize the information for the next 20 elements, the third for 20 more, and so on.

The style of presenting data in Nuclear Level

Schemes is very similar to that used on the Nuclear Data Cards and in the cumulated lists of Nuclear Science Abstracts. The cards, or the lists, will thus provide a convenient means of keeping this table up to date.

Nuclear Level Schemes ( $A = 40$  to  $A = 92$ ), TID-5300, can be ordered from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price \$1.75, 240 pages paperbound. Remittance should be by check or money order. Add 25% for foreign postage.

## CONVENTIONS

All energies are given in Mev and all cross sections in barns unless otherwise stated in the tabular material.

Numerals in italics, following measured values, are the errors (as reported by the authors) in the last figure of the values. In cases where confusion seems possible, the conventional  $\pm$  is used.

Magnetic moments are reported as before without diamagnetic correction. They are based on  $\mu(\text{H}) = 2.79267$  and the substandards listed by H. Walchli, ORNL-1469.

In writing reactions, the upper right hand superscript denoting  $A$ , the mass number of the target nucleus, is given without parentheses when the target was monoisotopic or when enriched (or depleted) material was used to establish the identity of the reacting isotope. It is given in parentheses when natural material was used and when the identity of the reacting isotope was strongly suggested by its predominating abundance, the observed reaction energy, or the activity or yield of the end product. It is given in parentheses with a question mark when the target  $A$  was assigned by systematics, elimination, etc. For instance, " $\text{B}^{10}(\text{d},\text{p})$ " means that the proton groups from the deuteron bombardment of  $\text{B}^{10}$  were identified by comparing effects in  $\text{B}^{10}$  enriched and natural B samples. " $\text{B}^{11}(\text{d},\text{p})$ " means that the assignment to  $\text{B}^{11}$  was made by using  $\text{B}^{11}$  depleted and natural B samples. " $\text{C}^{12}(\text{d},\text{p})$ " means that natural C was

used to study the reaction, but, because of the 99% abundance of  $\text{C}^{12}$ , the reaction observed was assumed to take place in that isotope. In the reaction " $\text{Sn}^{(116)}(\text{n},\text{p})^{115}\text{In}$ ," the Sn isotope was identified by the In product. " $\text{Te}^{(125?)}(\text{d},\text{p})\text{Te}^{(126?)}$ " indicates that from the trend of Q values in the region, the experimenters believed that their measured Q most likely belonged to the indicated reaction.

When a method of production of a radioactive nucleus is given, the lowest bombarding energy used by the experimenter is indicated; e.g., Ag(20-Mev p,n).

The large black dots on the decay schemes are used to indicate experimentally established coincidences.  $\alpha$ ,  $\beta$ , or  $\gamma$  rays entering a level and dotted at their arrowheads have been shown to be in coincidence with gamma rays leaving the same level and dotted at their origins. In case of a simple cascade, the dots of the incoming and outgoing rays are superimposed. Dashes are used for doubtful radiations or levels.

For the light nuclei, energy levels in the compound nucleus are usually tabulated rather than the resonant energy of the bombarding particle. The binding energy of the bombarding particle in the compound nucleus is taken from the table of F. Ajzenberg, T. Lauritsen, Revs. Modern Phys. **27**, 77(1955) for  $Z < 11$  and from P. M. Endt, J. C. Kluyver, Revs. Modern Phys. **26**, 95(1954) for  $Z$  from 11 to 20.

## ABBREVIATIONS

a	absorption	$E_\beta, E_\gamma, \dots$	energy of $\beta$ ray, energy of $\gamma$ ray, ...
a $\beta\gamma$	absorption of $\beta$ 's in coincidence with $\gamma$ 's	$E_{dis}$	disintegration energy
a ce	absorption of conversion electrons	EA	electrostatic analyzer
a coin	absorption of photoelectrons between counters in coincidence	$E1, E2, \dots$	electric dipole, electric quadrupole, ...
act	neutron detection by activation (Mn, Rh, Ag, ...)	$E_c$	energy of the electron capture transition (end point of $\gamma$ continuum + K binding energy)
$\alpha$	total $\gamma$ -ray conversion coefficient, $N_\alpha/N_\gamma$	$e_A$	Auger electron
$\alpha_K, \alpha_L, \dots$	$\gamma$ -ray conversion coefficient for electrons ejected from the K, L, ... shell	$e_{AK}, e_{AL}$	KXY, LXY Auger electron
$\alpha_0, \alpha_1, \dots$	$\alpha$ to g.s., first excited state, ... of residual nucleus	el	elastic scattering
B	band spectra method	$\epsilon$	electron capture
B(E2)	reduced E2 excitation probability in barns <sup>2</sup> (upward transition)	$\epsilon B(E2)$	partial B(E2) for radiation studied (photon, $ce_K$ , or $ce_L$ )
Be( $\gamma, n$ )	measurement by detection of photoneutrons from Be	$\epsilon_K, \epsilon_L$	electron capture from K, L shell
BF <sub>3</sub>	boron trifluoride neutron counter	$\eta(\theta)$	$[W(\theta) - W(\pi/2)]/W(\pi/2)$ , a measure of asymmetry in angular distributions, where $W(\theta)$ is the count at angle $\theta$
B <sub>n</sub> , B <sub>p</sub>	neutron, proton binding energy, i.e., energy necessary to remove particle from nucleus	f	fission
$\beta\gamma$ ( $L_c$ )	polarization-direction correlation of $\beta$ 's and $\gamma$ 's in coincidence	F-K	Fermi-Kurie plot
$\beta\gamma(\theta)$	angular correlation of $\beta$ 's and $\gamma$ 's in coincidence	$ft$	comparative half-life in the Fermi theory of $\beta$ decay calculated for an allowed transition. Superscript 1, 2, or 3 on $f$ indicates that comparative half-life is calculated for a unique 1st, 2nd, or 3rd forbidden transition.
calc	calculated from experimental work reported elsewhere	g	(1) gyromagnetic ratio (2) statistical weight factor, $\frac{1}{2}[1 \pm 1/(2J + 1)]$ , in $g \Gamma_n$
cc	cloud chamber	$\Gamma$	resonance half-width (the whole width at half-maximum)
CcW	Cockcroft Walton accelerator	$\Gamma_\gamma, \Gamma_n$	partial resonance half-width for $\gamma$ , neutron emission
ce	conversion electrons	$\gamma^\pm$	annihilation radiation
cnem	chemical separation of product following reaction	$\gamma$ continuum	continuous $\gamma$ spectrum associated with electron capture
Cp	Compton	$\gamma(Hg^{198})$	$\gamma$ is emitted from nucleus in parentheses rather than from radioactive parent
crit a	critical absorption	$\gamma(\theta, T)$	$\gamma$ intensity as function of angle and temperature
cryst	crystal spectrometer	$\gamma\gamma, \beta\gamma, \alpha\gamma, n\gamma$	$\gamma\gamma, \beta\gamma, \alpha\gamma$ , or $n\gamma$ coincidences. (0.123 $\gamma$ ) (0.246 $\gamma$ , 0.325 $\gamma$ ) means 0.123 $\gamma$ in coincidence with 0.246 $\gamma$ and 0.325 $\gamma$
cyc	cyclotron	$\gamma\gamma(\theta)$	angular correlation of $\gamma$ 's in coincidence
d	(1) deuteron, (2) descendant of, (3) days, when used as superscript	$\gamma\gamma(L_c)$	polarization-direction correlation of $\gamma$ 's in coincidence
D	double resonance method		
d, p( $\theta$ )	angular distribution of protons with respect to deuteron beam		
D( $\gamma, n$ ), D( $\gamma, p$ )	measurement by detection of photoneutrons or photoprotons from deuterium		
$\bar{E}$	average energy		
$E_0$	resonance energy		



GM	Geiger-Müller counter	q <sub>4</sub>	nuclear electric 16-pole moment in units of 10 <sup>-48</sup> cm <sup>4</sup>
g.s.	ground state	Q	reaction energy in Mev
h	hours	R	nuclear radius in fermis (10 <sup>-13</sup> cms)
I	nuclear induction method	s	(1) spectrometer method, (2) seconds, when used as super-script
IB	internal bremsstrahlung	s coh	coherent scattering
ic	ionization chamber	S	atomic spectra measurement
IT	isomeric transition	scin	1-crystal scintillation counter
J	spin in units h/2π	scin Cp	2-crystal scintillation counter
K/L, K/LM	$\alpha_K/\alpha_L$ , $\alpha_K/(\alpha_L + \alpha_M)$	scin pr	3-crystal scintillation counter
L <sub>1</sub> L <sub>2</sub> /L <sub>3</sub>	$(\alpha_{L_1} + \alpha_{L_2})/\alpha_{L_3}$	sd	double focusing spectrometer
l	orbital angular momentum	sl	lens spectrometer
Lin	linear accelerator	sl ce	conversion electrons measured in lens spectrometer
m	(1) medium intensity, (2) minutes, when used as a super-script	st	strong
M	molecular or atomic beam resonance method	σπ	180° spectrometer
M1,M2, ...	magnetic dipole, magnetic quadrupole, ...	σπ pr	180° pair spectrometer
mb	millibarns	σ	cross section in barns
Mev	million electron volts (10 <sup>6</sup> ev)	σ <sub>0</sub>	cross section at resonance energy, E <sub>0</sub>
mev	millielectron volts (10 <sup>-3</sup> ev)	σ <sub>a</sub>	absorption cross section
Mic	microwave method	σ <sub>t</sub>	total cross section
mir	measurement by total reflection of neutron beam from mirror surface	Σpc	proportional counter used to sum energy of transitions in cascade
mod cyc	modulated cyclotron	Σscin	scintillation counter used to sum energy of transitions in cascade
ms	(1) milliseconds, 10 <sup>-3</sup> s (2) mass spectrometer	t	(1) triton, H <sup>3</sup> , (2) total cross section when used under σ in cross section list
mμs	millimicroseconds, 10 <sup>-8</sup> s	T	(1) isotopic spin, (2) temperature
μ	nuclear magnetic moment (nuclear magnetons)	τ	half life in units indicated
μ <sub>3</sub>	nuclear magnetic octopole moment (nuclear magneton barns)	τ <sub>1</sub> , τ <sub>2</sub>	half life of upper, lower state
μs	microseconds, 10 <sup>-6</sup> s	τ <sub>ββ</sub> , τ <sub>εε</sub>	half life for double β, double ε decay
μμs	micromicroseconds, 10 <sup>-12</sup> s	th	thermal
n res	known resonance of a "standard" element used to identify an unknown neutron energy	trans	transmission
ν	neutrino	VdG	Van de Graaff accelerator
osc	pile oscillator method	w,vw	weak, very weak
p	(1) proton, (2) predecessor of	x	x radiation
para	paramagnetic resonance method	y	years
parentheses	parentheses are put around values which are given for identification purposes	Y <sub>γ</sub> , Y <sub>p</sub> , ...	yield of γ rays, yield of protons, ...
pc	proportional counter	%	number per 100 disintegrations. For γ's, total number of photons plus ce's is meant
pe	photoelectrons	†	number relative to other numbers marked †. For γ's, number of photons only is meant
ppl	photoplates or emulsions	+, -	even, odd parity when used in connection with level properties
pr	electron-positron pair		
p res	proton resonance. Magnetic field standardized by means of proton resonance frequency		
primes	primes indicate inelastically scattered particles		
q	electric quadrupole moment in units of barns		
quad res	quadrupole resonance method		

Standard journal abbreviations are used.

## 1. RADIOACTIVITY, LEVELS, ABUNDANCES, MOMENTS

$n^1$	$\mu$	-1.913150	M
0 1	$\nu(n)/\nu(p) =$	0.685057 16	

N. R. Corngold, V. W. Cohen, N. F. Ramsey, Bull. Am. Phys. Soc. 1, No. 1, 11, B7 (1956).

$\beta^-$       all for  $\beta$ 's from  $p\beta(145^\circ < \theta < 175^\circ)$ ,  
 $p\beta^-(E_\beta)$  consistent with  $g_1^2/g_8^2 = 1.49^{+1.44}_{-0.56}$

J. M. Robson, Phys. Rev. 100, 933 (1955).

$n^1$  Neutron electron interaction  
 $0^1$   $V = -4120 \pm 300$  ev (range =  $e^2/mc^2$ ) from transmission in liquid Bi,  $E_n = 0.1$  to 10 ev

E. Melkonian, B.M. Rustad, W.W. Havens, Jr.,  
Bull. Am. Phys. Soc. 1, No. 1, 62, UA8  
(1956); verbal report.

$H^3$   $T$  12.262<sup>y</sup> 4  $He^3$  growth  
1 2  
12<sup>y</sup> W.M.Jones, Phys. Rev. 100, 124 (1955).

$H^4$   $C^{(12)}(300, 430\text{-Mev p})$   
 13 No evidence for  $\beta$  emitter,  $E_\beta > 12$ ,  $\tau = 1$  to  $10^{10}$  s  
 $\sigma(\tau = 2 \text{ to } 4^{10}) < 10^{-6}$  a, delay  
 $\sigma(\tau = 4 \text{ to } 10^{10}) < 10^{-5}$

A. A. Reut, S. M. Korenchenko, V. V. Yur'ev, B. M. Pontecorvo, Doklady Akad. Nauk SSSR 102, 723 (1955); AERE Lib/Trans. 600.

${}^4_2\text{He}$     Level     $\text{H}^3(\text{p},\text{n})$      $E_p = 1.4 \text{ to } 6.8$   
           100°    22     $J = 2^-$      $\text{p}, \text{n}(\theta); \text{BF}_3$   
 $\sigma$  has broad max at  $E_p = 3$ . Large  $\int d\sigma$  at  
 (0.58) implies  $J = 2$ . Increase with  $E_p$  of  
 asymmetry in  $\text{p}, \text{n}(\theta)$  suggests  $1^-$  level at  $> 25$   
 \*Peak  $\sigma(0^\circ)$  in mb/sterad

$H^3(p, \gamma)$	$E_p = 1.7 \text{ to } 6.8$
No resonance observed	scin > 14-Mev $\gamma$

M.A.Vlasov, S.P.Kalinin, A.A.Ogloblin, V.A.  
Sidorov, V.I.Chuev, Soviet Phys. JETP 1, 500  
(1955); Zhur. Eksptl' i Teoret. Fiz. 28, 639  
(1955).

He<sup>4</sup> H<sup>2</sup>(d,n) E<sub>d</sub> = 0.25 to 0.82  
2 2 d,n(θ,E) studied. Less isotropy found than in  
previous work. Stripping-theory fit possible  
if R assumed to decrease as E<sub>d</sub> increases.  
2 crystal delay spectrometer

P.R.Chagnon, G.E.Owen, Phys. Rev. 101, 1798 (1956).

Table of  $\sigma(0^\circ)$  given  $H^2(d,n)$   $E_d = 1.15$  to  $4.60$  ppl

$H^3(p,n)$        $E_p \approx 8.8$  to  $11.4$   
 Table of  $\sigma(0^\circ)$  given ppl  
 $\sigma(0^\circ)$  increases with  $E_p$  from 18 to 31 mb/s terad

L. Stewart, G.M. Frye, Jr., L. Rosen, Bull. Am. Phys. Soc. 1, No. 2, 93, M2 (1958).

He<sup>(4)</sup> (p, p')      E<sub>p</sub> = 3.2; a, scin  
No level ≤ 28 Mev      σ(60°) < 0.25 mb/sterad

R.M.Eisberg, Bull. Am. Phys. Soc. 1, No. 1, 19, DA1 (1956).

$\text{He}^5$ 2 3	Level	$\text{Li}^{(7)}(\text{d}, \alpha)$ g. s.	$E_d = 3.7$ s
		Q = 13.719 20	

L.M.Khromchenko, V.A.Blinov, Soviet Phys. JETP 1, 596 (1955); Zhur. Eksptl'. i Teoret. Fiz. 28, 741 (1955).

$H^3(d,n)$   $E_d = 0.2$  to 6.25  
Tables of  $\sigma(\theta, E)$  given pc, scin

S. J. Bane, Jr., J. E. Perry, Jr., Bull. Am. Phys. Soc. 1, No. 2, 93, M3 (1956).

$H^3(d,n)$   $E_d = 1$  to 5; pc+scin  
No sharp resonance but  $\sigma$  rising at  $E_d = 5$   
Forward peak in  $d,n(\theta)$  sharper with higher  $E_d$

C.H. Johnson, A. Galonsky, Phys. Rev. 100, 1252A (1955).

- $\text{He}^6$   
2 4  $\text{H}^3(t,t)$   $E_t = 1.6$  to  $2.0$   
 $\sigma(\theta, E)$  measured. No evidence of  $\text{He}^6$  excited  
state between 13.05 and 13.25 pc in coin  
D.M.Holm, H.V.Argo, Phys. Rev. 101, 1772  
(1956).
- $\text{Li}^5$   
3 2  $\text{He}^{(4)}(p,p)$   $E_p = 7.5$ , 31 angles  
Phase shifts agree with values for lower  $E_p$   
T.M.Putnam, J.E.Brolley, Jr., L.Rosen, Bull.  
Am. Phys. Soc. 1, No. 1, 9, AB2 (1956).
- Polarization  $\text{He}^{(4)}(p,p); (p,p)$  ppl  
 $E_{p1} = 5.32$ ,  $\theta_1 = 45^\circ$  for 1st scattering,  $S_1$   
 $E_{p2} = 2.7$ ,  $\theta_2 = 190^\circ$  for 2nd scattering,  $S_2$   
 $P_1$ , polarization after  $S_1$ ,  $= 0.40 \pm 0.05$  agreeing  
with  $P_1 = 0.39 \pm 0.04$  calc. from phase shifts.  
 $D_{1/2}, D_{3/2}$  splitting of several Mev implied.  
A.C.Juveland, W.Jentschke, Z. Phys. 144, 521  
(1956).
- Polarization  $\text{He}^{(4)}(p,p); (p,p)$   $E_p = 3.0$ ; ppl  
 $\theta_1 = 90^\circ$  c.m.;  $\theta_2 = 173^\circ, \pm 100^\circ, \pm 125^\circ$  c.m.  
 $P_1, P_2$  from forward-backward ratio agrees with  
value calculated from phase shifts  
M.J.Scott, R.E.Segel, Phys. Rev. 100, 1244  
(1955).
- Capture  $\gamma$ 's  $\text{H}^2(\text{He}^3, \gamma)$   $E_{\text{He}^3} \leq 1.5$ ; scin  
 $E_{\gamma}(\text{max}) \sim 16.5$ , spread in  $E_{\gamma} \sim$  several Mev  
W.E.Kunz, J.W.Butler, H.D.Holagren, Phys.  
Rev. 100, 1252A (1955).
- $\text{Li}^6$   
3 3 Levels  $\text{Li}^{(7)}(p,d)$   $E_p \sim 18$   
17 $\uparrow$  g.s.  $l_n = 1$  p,d( $\theta$ )  
8.5 $\uparrow$  (2.19)  $l_n = 1$   
 $\uparrow$ Peak  $\sigma$  in mb/sterad c.m.  
J.B.Reynolds, K.G.Standing, Phys. Rev. 101,  
158 (1956); 95, 639A (1954).
- $\text{Li}^7$   
3 4  $\text{He}^{(4)}(t,t)$   $E_t = 1.2$  to  $2.2$   
Table of  $\sigma(\theta, E_t)$  given  
A.Hemmendinger, Bull. Am. Phys. Soc. 1, No. 2,  
96, N7 (1956).
- Levels  $\text{Li}^{(6)}(d,p)$   $E_d = 3.7$  to  $4.7$   
4.434  $\sim 20$  s  
6.530  $\sim 20$   
Based on g.s.  $Q = 5.020$   
L.M.Khromchenko, V.A.Blinov, Soviet Phys.  
JETP 1, 596 (1955); Zhur. Eksptl' i Teoret.  
Fiz. 28, 741 (1955).
- $\text{Be}^7$   
3 4 Levels  $\text{Be}^9(d,\alpha)$   $E_d = 0.50, 0.70$   
4.62 s;  $70^\circ$   
No evidence of 5.5 level  
R.W.Gelinas, S.S.Hanna, Phys. Rev. 100,  
1253A (1955).
- Level  $\text{Li}^{(6)}(n,n)$   $E_n = 0.21$  to  $0.40$   
(7.46)  $J = 5/2^-$  n,n( $\theta$ )  
H.B.Willard, J.K.Bair, J.D.Kington, H.O.Cohn,  
Phys. Rev. 101, 765 (1956).
- $\text{Li}^8$   
3 5 Levels  $\text{Li}^{(7)}(d,p)$   $E_d = 3.7$  to  $4.7$   
g.s.  $Q = -0.183$  20 s  
0.977 20  
L.M.Khromchenko, V.A.Blinov, Soviet Phys.  
JETP 1, 596 (1955); Zhur. Eksptl' i Teoret.  
Fiz. 28, 741 (1955).
- Level  $\text{Li}^{(7)}(n,n)$   $E_n = 0.229$  to  $0.275$   
(2.28)  $J = 3^+$  n,n( $\theta$ )  
Background s-wave channel spin 2 predominant  
R.G.Thomas, M.Walt, R.B.Walton, R.C.Allen,  
Phys. Rev. 101, 759 (1956).
- Level  $\text{Li}^{(7)}(n,n)$   $E_n = 0.20$  to  $0.60$   
(2.28)  $J = 3^+$  n,n( $\theta$ )  
Background s-wave channel spin statistical  
H.B.Willard, J.K.Bair, J.D.Kington, H.O.Cohn,  
Phys. Rev. 101, 765 (1956).
- Polarization  $\text{Li}^{(7)}(p,n); \text{Li}^{(7)}(n,n)$   
 $E_p = 2.2$ ,  $\theta_1 = 70^\circ$ ;  $E_n = 0.28$ ,  $\theta_2 = 149^\circ, \pm 82^\circ$   
 $P_1, P_2$  (due to  $\text{Li}^8$  2.28 level)  $\sim 0.24$   
H.B.Willard, J.K.Bair, H.O.Cohn, J.D.Kington,  
Bull. Am. Phys. Soc. 1, No. 1, 54 R1 (1956).
- Levels  $\text{Li}^{(7)}(p,n)$   $E_p = 2.6$  to  $2.9$   
100+ g.s.  $\text{He}^3(n,p)$  detector  
 $\sim 4^+$  to  $10^+$  (0.43) at several angles  
 $p,n(\theta) \sim$  isotropic for both n groups  
 $\sigma(0.43 \text{ level})/\sigma(\text{g.s.})$  increases with  $E_p$   
R.Batchelor, G.C.Morrison, Proc. Phys. Soc.  
68A, 1081, 452 (1955).
- Level  $\text{Li}^{(7)}(p,n)$   $E_p = 1.8$  to  $4.5$ ; VdG,  
0.434 4 thresh n,  $\sim 0^\circ$   
 $\sigma(0.434 \text{ level})/\sigma(\text{g.s.}) = 0.0018$  6 for  $E_p = 2.40$   
J.B.Marion, T.W.Bonner, C.F.Cook, Phys. Rev.  
100, 91 (1955).



$\text{Be}^7$   
4 3 Capture  $\gamma$ 's  $\text{Li}^6(p,\gamma)$   $E_p = 0.4$  to 1  
38†  $\sim 5.8$  Q = 5.66 3 scin  
62†  $\sim 6.2$   
†Intensity ratio not f(E or  $\theta$ ).  $W(\theta) = 1 + \cos^2\theta$

J.B. Warren, T.K. Alexander, G.B. Chedwick,  
Phys. Rev. 101, 242 (1956).

$\text{Be}^8$   
4 4 Level  $\text{Be}^9(p,d)$   $E_p = 31.3$   
g.s.  $l_n = 1$  ? p,d( $\theta$ )  
Poor stripping-theory fit ( $R=4$ )

J. Benveniste, R.G. Finke, E.A. Martinelli,  
Phys. Rev. 101, 655 (1956).

Level  $\text{Be}^9(p,d)$   $E_p = 16.5$   
11† g.s.  $l_n = 1$  (2?) p,d( $\theta$ )  
† $\sigma(23^\circ)$  in mb/sterad c.m.  
Stripping theory fit requires  $R=3$  while at  
 $E_p = 5$ ,  $R=6$  is needed. Cf.  $\text{He}^4$ , Chagnon.

J.B. Reynolds, K.G. Standing, Phys. Rev. 101,  
158 (1956); 95, 639A (1954).

Level  $\text{He}^4(\alpha,\alpha)$   $E_\alpha = 3$  to 5  
g.s.  $\Gamma = 17$  ev  $\alpha,\alpha(\theta)$

J.L. Russell, G.C. Phillips, C.W. Reich, R.R.  
Henry, Bull. Am. Phys. Soc. 1, No. 2, 96,  
N8 (1956); verbal report.

Levels  $\text{Li}^6(\text{He}^3,p)$   $E_{\text{He}^3} = 1.25$   
g.s. 45°, 90°, 135°  
100† 2.9 absorbers + scin  
5.6† 12.3  $\Gamma \sim 2$   
No evidence for levels at 4.05, 4.9, 5.3, 7.5  
( $<1$ † if sharp,  $<3$ † if broad)

C.D. Moak, W.R. Wissemann, Phys. Rev. 101, 1326  
(1956).

Levels  $\text{C}^{12}(\gamma,\alpha)$  2500 stars; ppl  
Level  $\Gamma$  J  $E_\gamma \leq 40$   
g.s. 0.03 0  
2.95 10 0.70 15 2  
4.0 1 ? <0.3 2,4  
6 ? <1.0 0,2,4  
10 ? <1.0 0,2,4  
15 ? <1.0 0,2,4  
16.4 2 ? <0.4 0,2  
16.8 2 <0.3 2  
17.6 2 <0.3 2(0?)

? Not only possible interpretation of data  
 $\gamma,\alpha(\theta)$  for g.s., 2.9, 16.8, 17.6 levels. See  $\text{C}^{12}$ .

F.K. Goward, J.J. Wilkins, Proc. Roy. Soc. 228,  
376 (1955).

Level  $\text{B}^{11}(p,\alpha_i)\text{Be}^8 \rightarrow 2\alpha_i$   $E_p = 0.163$   
(2.9) J = 2  $\alpha_i\alpha_j(\theta)$

E.H. Geer, E.B. Nelson, E.A. Wolicki, Phys. Rev.  
100, 215; 98, 241A (1955).

$\text{Be}^8$   
4 4 Level  $\text{Li}^7(p,\gamma)\text{Be}^8 \rightarrow 2\alpha$   $E_p = 0.44$   
2.9 s  
No  $\alpha$  groups attributable to  $\text{Be}^8$  levels at  
2.0, 2.6, 3.7 ( $<1.0, 0.7, 0.5\%$  of total  $\alpha$ 's)

E.C. LaVier, S.S. Hanna, R.W. Gelinas, Phys.  
Rev. 100, 1252A (1955).

Levels  $\text{C}^{12}(\gamma,\alpha)$   $E_\gamma \leq 27, \leq 33$   
Distribution of  $\text{Be}^8$  excitation energies  
calculated from 485 stars shows maxima at  
 $\sim 2.5, \sim 9$  ( $E_\gamma < 12.5$ );  $\sim 2.5, \sim 10.5, \sim 13.5$ ,  
 $\sim 16.5$  ( $E_\alpha > 12.5$ )

F.I. Havliček, B. Dobovišek, Phys. Rev. 100,  
1355 (1955).

Levels  $\text{C}^{12}(\gamma,\alpha)$   $E_\gamma = 17.6$ ; ppl  
3.2 455 stars  
4.0  
7.5 broad  
9.0

H. Glättli, E. Loepfe, P. Stoll, Helv. Phys. Acta  
28, 366A (1955).

$\text{Be}^9(d,t)$   $E_d = 0.47$  to 1.15  
No evidence of level 4.0 to 4.3 s;  $23^\circ$  to  $90^\circ$

R.W. Gelinas, S.S. Hanna, Phys. Rev. 100,  
1253A (1955).

Levels  $\text{Li}^{7}(p,\gamma)$   $E_p = 0.40, 0.47, 0.54$   
No levels between 7 and 15 Mev excited  
( $<3\%$  of g.s.) pc for  $\gamma$ 's,  $90^\circ$

A.C. Riviere, P.B. Treacy, Australian J. Phys.  
8, 408 (1955).

Level  $\text{Li}^{7}(p,\gamma)$  p res. calibration  
17.628  $E_0 = 0.4412$  6 s77

P. Bumiller, H.H. Staub, H.E. Weaver, Helv.  
Phys. Acta, 29, 83 (1956); 28, 355A (1955).

Levels  $\text{Li}^7(p,p)$   $E_p = 1.3$  to 3.0  
At 6 angles from  $70^\circ$  to  $167^\circ$ ,  $\sigma$  shows max at  
2,000, dip at 2.230, anomaly near 1.882

P.R. Malmberg, Phys. Rev. 101, 114 (1956); 98,  
1167A (1955).

$\text{Be}^9$   
4 5

Level  $\text{Be}^9(p,d)$   $E_p = 31.3$   
g.s.  $l_n = 1$  ? p,d( $\theta$ )  
See  $\text{Be}^8$ , Reynolds, Standing; Benveniste et al.

$\text{Be}^9$ 4 5	Levels	$\text{Be}^9(\alpha, \alpha')$ g.s.	$E_\alpha = 44$ ; a pc 13°, 70°, 114°
	< 1†	1.8	
	10†	2.4 1	13°, 70°, 114°
	5†	3.1 ?	70°

$\alpha, \alpha'(\theta)$  suggests collective excitation

Levels at 4.8, 6.8 not seen

†Relative intensity at 70°

G.W.Farwell, D.D.Kerlee, Bull. Am. Phys. Soc. 1, No. 1, 20, DA5 (1956); verbal report.

Levels	$\text{Be}^9(p, p')$ g.s.	$E_p = 4.6$ to 5.3 s
23†	1.675 2 ?*	
1†	2.432 4	$\Gamma \leq 0.001$ implies $J \geq 5/2$

$\sigma(170^\circ)$  in mb/sterad

\*Attributable to level or 3-body break-up

C.R.Gossett, G.C.Phillips, J.P.Schiffer, P.M.Windham, Phys. Rev. 100, 203 (1955).

Levels	$\text{Be}^9(p, p')$ Level	$E_p = 31.3$ ; $p, p'(\theta)$ l
	g.s.	1, (2?) 7.94 8 3
	2.46 5	1(2?) 11.3 2
	5.0 3	19.9 1 0
	6.76 6	1** 21.7 1 0 or 1

\*l of Austern, Butler, McManus theory

\*\*If level is double, l = 1 for 6.2, 2 for 6.8  
3 pc differential range spectrometer

J.Benveniste, R.G.Finke, E.A.Martinelli, Phys. Rev. 101, 655 (1956).

Levels	$\text{Be}^9(\alpha, \alpha')$ $\text{Be}^9(d, d')$	$E_\alpha = 21.6$ $E_d = 10.8$
	1.74 10 ?*	s; several angles
	(2.428)	
	3.01 10	

\*Attributable to level or 3-body break-up

D.W.Miller, V.K.Rasmussen, M.B.Sampson, U.C.Gupta, Phys. Rev. 100, 851, 1253A (1955).

Levels	$\text{Be}^9(p, p')$ $\text{Be}^9(d, d')$ $\text{Be}^9(\alpha, \alpha')$	$E_p = 12$ $E_d = 24$ $E_\alpha = 48$
~1†	1.8 ?	
100†	2.43	$l_x = 1$ xx'( $\theta$ )

R.G.Summers-Gill, Phys. Rev. 100, 1795A (1955).

Level	$\text{Be}^9(n, n')$ (2.43) decays to $\text{Be}^8 + n$	$E_n = 3.7$ scin
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J.M.Fowler, S.S.Hanna, G.E.Owen, Phys. Rev. 98, 249A (1955).

$\text{Be}^{10}$ 4 6	Yield in $\text{U}^{235}(n, f) \leq 4 \times 10^{-4}\%$
2.5x10 <sup>6</sup> y	K.F.Flynn, L.E.Glendenin, E.P.Steinberg, Phys. Rev. 101, 1492 (1956).

$\text{B}^9$ 5 4	Levels	$\text{B}^{10}(p, d)$ g.s.	$E_p = 18.9$ p, d( $\theta$ )
		$l_n = 1$	
		2.41 15	$l_n = 1$

J.B.Reynolds, K.G.Standing, Phys. Rev. 101, 158 (1956); 95, 639A (1954).

Levels	$\text{Be}^9(p, n)$ 1.4° ?	$E_p = 2.0$ to 5.5; VdG $\Gamma \sim 1$ thresh n, $\sim 0^\circ$
	2.327 5	Q = -4.178 5

\*Also attributable to 3-body break-up

$\sigma(E_p = 2.52) = 11$  mb/sterad

J.B.Marion, T.W.Bonner, C.F.Cook, Phys. Rev. 100, 91 (1955).

$\text{B}^{10}$ 5 5	Level	$\text{B}^{11}(p, d)$ g.s.	$E_p = 18.9$ p, d( $\theta$ )
		$l_n = 1$	

J.B.Reynolds, K.G.Standing, Phys. Rev. 101, 158 (1956); 95, 639A (1954).

Levels	$\text{Li}^7(\alpha, n)$ g.s.	$E_\alpha \sim 8$ Q = -2.82 10
	0.74 6	p recoil,
	1.31 6	thresh n; $\sim 0^\circ$
	1.72 6	

A.B.Robbins, Phys. Rev. 101, 1373 (1956); 100, 1549A (1955).

Level	$\text{Be}^9(d, n)$ (0.72)	time of flight $\tau = 790 \mu\text{s}$ 200
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J.C.Severiens, S.S.Hanna, Phys. Rev. 100, 1254A (1955); verbal report.

$\text{B}^{11}$ 5 6	Levels	$\text{Li}^{(7)}(\alpha, n)$ 2.5° 11.69 3.4° 11.95	$E_\alpha = 4.1$ to 5.8 thresh n, $\sim 0^\circ$
		$\Gamma = 0.24$	

\* $\sigma(0^\circ)$  in mb/sterad

H.Bichsel, T.W.Bonner, Bull. Am. Phys. Soc. 1 No. 2, 93, M5 (1956).

Levels	$\text{Be}^9(\text{He}^3, p_0)$ Graphs of $\text{He}^3, p_0(\theta)$ ; $\text{He}^3, p_1(\theta)$ ; $\text{He}^3, p_2(\theta)$ ; $\text{He}^3, p_3(\theta)$ show no symmetry about $90^\circ$	$E_{\text{He}^3} = 2$ ; ppl
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H.D.Holmgren, W.E.Kunz, M.L.Bullock, Phys. Rev. 100, 436, 1253A (1955).

$\text{B}^{12}$ 5 7	$\beta^-$	17† (8.94) 1000† (13.37)	pc, scin $\beta\gamma$
0.03s		No $\gamma$ with $3.3 < E_\gamma < 4.5$ ( $< 4 \pm 20$ †)	
		$\text{Li}^8$ comparison	$\text{B}^{(11)}(d, p)$ , pulsed beam

N.W.Tanner, Phil. Mag. 1, 47 (1956).

$B^{12}$   $\beta(4.4\gamma)/\beta = 0.013 \pm 4$  scin  
 $^{57}\text{Fe}$   $\beta(3.2\gamma)/\beta \leq 0.002$   $\beta(7.6\gamma)/\beta \leq 0.002$   
 $0.03 \pm 8$  Conclude  $J = 1$  for  $B^{12}$  g.s.

C. A. Barnes, R. W. Kavanagh, Phys. Rev. 100, 1796A (1955).

$\alpha \sim 1\% \quad 0.195 \quad B^{11}(d,p); \quad s$   
Presumably from  $C^{12} \quad 7.65$  level to  $Be^8$  g.s.

W.A.Fowler, C.W.Cook, C.C.Lauritsen, T.  
Lauritsen, F.Mozer, Bull. Am. Phys. Soc. 1,  
No. 4, 191 M2 (1956).

$B^{12}$	Level	$Be^9(\alpha, p)$	$E_\alpha = 21.6$
5 7		3.38	s

p's to this level previously\*interpreted as d's

V.K. Rasmussen, D.W. Miller, M.B. Sampson, U.C. Gupta, Phys. Rev. 100, 851 (1955); \*W.O. McMinin et al., Phys. Rev. 84, 963 (1951).

$C^{11}_{6\ 5}$	Levels	$B^{10}(d,n)$	$E_d = 0.35$ to $4.5$ ; VdG
	0.18†	<b>8.107</b> g	thresh n, $\sim 0^\circ$
	1.0†	<b>8.430</b> g	
	1.6†	<b>8.660</b> g	

No n thresholds observed corresponding to levels at 6.87, 7.39, 8.97, 9.13, 9.70, 10.06  
Graph of  $\sigma(\sim 0^\circ)$  given for n yield  
†Relative intensities at thresholds,  $0^\circ$

J.B.Marion, T.W.Bonner, C.F.Cook, Phys. Rev.  
100, 847 (1955).

$C^{12}$	Levels	$B^{10}(\alpha, d)$	EA
6		g.s. $Q = 1.3405 \ 10$	
		$N^{(14)}(d, \alpha)$	EA
		(9.64) $Q = 3.928 \ 11$	$\Gamma \sim 0.035$

R. Chiba, R. A. Douglas, J. W. Broer, D. P. Herring,  
E. A. Silverstein, Phys. Rev. 100, 1253A (1955);  
verbal report

Levels	$C^{(12)}(\alpha, \alpha')$	$E_\alpha = 22$
	g.s.	s
	(4.43)	
	7.64 7	$\Gamma_\alpha/\Gamma_\gamma > 0.8^*$
	(9.6)	
	(12.7) ?	

\*From absence of C recoils  
 $\alpha, \alpha'(\theta)$  not symmetric about  $90^\circ$  c.m.

V.K.Rasmussen, D.W.Miller, M.B.Sampson, Phys.  
Rev. 100, 181 (1955).

Levels	$\text{Be}^9(\alpha, n \gamma)$	$E_\alpha \leq 4.3$
3mb*	4.48 6	sl pr
	(7.6)	$\Gamma_\alpha / \Gamma_\gamma = 0.96^{**}$

\*From absence of prs from 7.6 level to g.s.  
and 4.5 level (<5% of prs from 4.5 level)  
\*Average  $\sigma$  for  $E_c = 0$  to 4.3

R. D. Bent, T. W. Bonner, J. H. McCrary, W. A. Ranken, Phys. Rev. 100, 771 (1955).

$C^{12}$       Level       $Be^9(\alpha, n)$        $E_a = 5.3$   
 ■ ■      (7.6)  
 No prs observed from 7.6 level (< 0.3% of  
 prs from 4.4 level)

G. Goldring, R. Wiener, Y. Wolfson, Bull.  
Research Council Israel 5A, 87A (1955).

Level  $B^{(11)}(d, n)$   $E_d = 1.0$  to  $5.5$ ; VdG  
13.100 6 thresh  $n, \sim 0^\circ$   
Graph of  $\sigma(\sim 0^\circ)$  given for  $n$  yield

J.B. Marion, T.W. Bonner, C.F. Cook, Phys. Rev. 100, 847 (1955).

Level             $B^{(11)}(d, n \gamma)$      $E_d = 1.6$  to  $3.3$   
                   $15.106^{+3}$     No  $\alpha$  observed; scin  
 \*From threshold for  $\sim 15\gamma = 1.633$      $3$   
                   $12.8\gamma$  observed at  $E_d = 1.63^{**}$

C.A. Barnes, R.W. Kavanagh, Phys. Rev. 100, 1796A (1955); \*\*verbal report.

Level  $C^{(12)}(\gamma, \gamma)$   
15.0 2  $\Gamma \sim 100$  ev  $\Gamma_\gamma/\Gamma > 0.5$

E.G. Fuller, E. Hayward, N. Svantesson, Bull.  
Am. Phys. Soc. 1, No. 1, 21, D48 (1956);  
verbal report.

Levels	$B^{(11)}(p, a_i) 2a_j; E_p = 0.163, 0.290$
(16.10)	$J = 2, a_i a_j(\theta)$
(16.57)	$J = 2^-, 3^+, J = 2^+$
(17.22)	$J = 1^-$

\*Assuming single level is responsible for  $\alpha_i a_i(\theta)$  for  $E_D = 0.290$ . Results also explainable by mixture, 16.57 (2<sup>-</sup>), 17.22 (1<sup>-</sup>)

E.H. Geer, E.B. Nelson, E.A. Wolicki, Phys.  
Rev. 100, 215; 98, 241A (1955).

Levels	$B^{11}(p, \gamma_0 \text{ or } \gamma_1)$	$E_p = 2.0 \text{ to } 5.3$			
	$B^{11}(p, n)$	VdG $0^\circ, 90^\circ$			
	$B^{11}(p, p' \gamma_j)$	scin. long counter			
$\Gamma$	Level	$n$	$\gamma_0$	$\gamma_1$	$\gamma_j$
0.3	18.3	--	st	w	--
0.046	18.39	--	--	--	st
0.1	18.84	st	st	w	st
0.5	19.2	st	st	st	st
0.05	19.41	--	--	--	st
0.2	19.66	st	--	--	--
0.1	19.87	--	w	--	st
0.2	20.25	st	--	--	st
0.2	20.48	--	st	--	--
0.2	20.64	--	st	--	st

J.K.Bair, J.D.Kington, H.B.Willard, Phys. Rev.  
100, 21 (1955).

Levels*	$C^{(12)}(\gamma, n) 20^{\circ}C^{11}$	$E_{\gamma} \leq 20$
	19.10 5	
	19.55 5	

\* Sharp peaks in activation curve

B.M.Spicer, A.S.Penfold, Phys. Rev. 100, 1375 (1956).



$^{12}_6\text{C}$	$\text{C}^{(12)}(\gamma, n)$	$E_\gamma \leq 23$	$^{13}_7\text{C}$	Levels	$\text{C}^{(12)}(n, n'\gamma)$	$E_a = 4.4$ to 8
$\gamma, n(\theta)$ possibly has dip at $90^\circ$		n scin			10.77	scin 4.4 $\gamma$
					10.94	
					11.97	
					12.21	

B. P. Fabricand, B. Allison, J. Halpern, Phys. Rev. 100, 1249A (1955).

H. E. Hall, T. W. Bonner, Bull. Am. Phys. Soc. 1, No. 2, 96, M10 (1956).

Levels  $\text{C}^{(12)}(\gamma, 3\alpha)$   $E_\gamma \leq 27, \leq 33$   
Distribution of  $\text{C}^{12}$  excitation energies calc.  
from 485 stars. Levels not clearly resolved.

F. I. Havlicek, B. Dobovisek, Phys. Rev. 100, 1355 (1955).

$E_\gamma$	$\text{C}^{(12)}(\gamma, 3\alpha)$	$E_\gamma \leq 40$ ; ppl
	Be <sup>8</sup> levels*	$\gamma, \alpha(\theta)$
13.0 to 15.6	E2 g.s.	2500 stars
	E2, M1 2.9	
15.6 to 25	E1, E2 2.9, 4.0, g.s., 6 and 10, 15	
> 25	E1 16.8, 17.6, 6 and 10	
	2.9 and 4.15, g.s.	

\*In order of observed frequency. See Be<sup>8</sup>

Level 21.9 J = 2<sup>+</sup> T = 0  
Only level of previous work to which spin could be assigned

F. K. Goward, J. J. Wilkins, Proc. Roy. Soc. 228, 376 (1955).

$^{13}_6\text{C}$	Level	$\text{C}^{(12)}(d, p)$	$E_d = 2.68, 3.26$
	19, 13 <sup>+</sup>	g.s.	

$\dagger \sigma(\text{peak})$  for above  $E_d$  respectively.  $\sigma$ 's for  $\text{C}^{13}, \text{N}^{13}$  show g.s. reduced widths ~ same.

R. E. Beneson, K. W. Jones, M. T. McEllistrem, Phys. Rev. 101, 308 (1956).

Levels	$\text{B}^{10}(\alpha, p)$	$E_a = 8.1$
100 <sup>+</sup>	g.s.	Q = 4.08 3
60 <sup>+</sup>	3.07 5	scin, 90°
600 <sup>+</sup>	3.86 5	

No 0.7 level (< 7<sup>+</sup>)

G. F. Pieper, G. S. Stanford, Phys. Rev. 101, 672 (1956).

Levels	$\text{C}^{12}(d, p)$	$E_d = 14.8$ ; s
	$I_n$	d, p( $10^\circ < \theta < 87^\circ$ )
26 <sup>+</sup>	g.s.	1 9.6 <sup>+</sup> 7.53 2
103 <sup>+</sup>	3.09	0 7.5 <sup>+</sup> 7.64° 2
16 <sup>+</sup>	3.68	1 100 <sup>+</sup> 8.4° 3
152 <sup>+</sup>	3.86	2 1.6 <sup>+</sup> 9.50 2
3.6 <sup>+</sup>	6.87	0.2 2.2 <sup>+</sup> 9.90 2
0.8 <sup>+</sup>	7.47	2 5.5 <sup>+</sup> 10.76 2

d, p( $\theta$ ) shows forward peak for all except 9.50 level for which distribution is isotropic

$I_n \dagger \dagger$  mb/sterad at  $\dagger$  max or at  $\dagger \dagger 10^\circ$   
 $\Gamma = 0.070 \pm 0.015$   $\Gamma = 1.1 \pm 0.3$

J. M. McGruer, E. K. Warburton, R. B. Bender, Phys. Rev. 100, 235 (1955).

Levels	$\text{Be}^9(\alpha, n\gamma)$	$E_a = 1.6$ to 5.2
$\sigma_n$	Level	$\Gamma$
25	14	11.97 0.2
14		12.25 ~0.2
20	5	12.45 ~0.2
79	20	13.41 0.06
60	18	13.7 ~0.4
87	23	14.1 ~0.3

\*mb/sterad, 0 to 20° \*\*mb/sterad, 0° to 10°

J. P. Schiffer, T. W. Bonner, A. A. Kraus, Jr., J. B. Marion, Bull. Am. Phys. Soc. 1, No. 1, 20, DA3 (1956); verbal report.

Levels	$\text{Be}^9(\alpha, n)$	$E_a = 1.7$ to 5.1
	Level	n group
	12.45	$n_0(\text{st}), n_1(\text{w})$
	13.5	$n_1(\text{st})$ small
	13.5 to 13.8	$n_0, n_1$ large

$\alpha, n(\theta)$  shows forward peaking

J. R. Risser, C. M. Class, J. E. Price, Bull. Am. Phys. Soc. 1, No. 1, 20, DA4 (1956).

Levels	$\text{Be}^9(\alpha, n_0)$	$E_a = 2.5$ to 5
	Level	J
	12.45	-
	~13.5	5/2 <sup>+</sup>
	13.7	3/2 <sup>+</sup>
	> 14	7/2 <sup>+</sup>

$\alpha, n(\theta)$

J. R. Risser, Bull. Am. Phys. Soc. 1, No. 2, 93 M4 (1956).

Resonance	$\text{C}^{13}(\gamma, n)$	$E_\gamma \leq 45$
peaks 4°	14.5 $\Gamma = 4$	BF <sub>3</sub>
	9.5° 24 $\Gamma = 8$	

\* $\sigma(\text{peak})$  in mb

B. C. Cook, V. L. Telegdi, Bull. Am. Phys. Soc. 1, No. 1, 63, UA11 (1956); verbal report.

Levels	$\text{B}^{(11)}(d, n+15.1\gamma)$	$E_d \leq 3.3$
$\sigma = 17\text{mb}$	20.51 ?	Sharp decrease in slope
	21.27	Weak resonance, $\Gamma \sim 0.18$

C. A. Barnes, R. W. Kavanagh, Phys. Rev. 100, 1796A (1955).

$C^{13}$  Levels  $B^{11}(d, n_0)$   $E_d = 3.5$  to  $5$   $N^{13}$   
 6 7 22 to 23  $J = 7/2$   $d, n_0(\theta)$  7 6

J.E.Price, C.M.Class, J.R.Risser, Bull. Am. Phys. Soc. 1, No. 2, 94, M10 (1956).

$C^{14}$  Levels  $C^{13}(d, p)$   $E_d = 14.8$ ; s  
 6 8  $\frac{I_n}{d, p(10^\circ < \theta < 87^\circ)}$

10†	g.s.	1	7.1††	9.80	2
62†	6.09	0	~1.9††	10.43	2
1.6†	6.59	2 0, 2	1.4††	10.50	2
74†	6.72	2	90††	11.9*	3
22†	6.89	1	6.3††	12.60*	2
56†	7.35	2 2	1.0††	12.85	2
2.2††	8.32	2	1.9††	12.96	2

d, p( $\theta$ ) shows forward peak for all levels

†, †† mb/sterad at † max or at ††  $10^\circ$

\* $\Gamma = 0.13 \pm 0.02$  \*\* $\Gamma = 1.1 \pm 0.3$

J.N.McGruer, E.K.Warburton, R.S.Bender, Phys. Rev. 100, 235 (1955).

Levels  $C^{13}(d, p\gamma)$   $E_d = 4.1$   
 (6.1)  $E1 \gamma$  (assumed) s1 pr  
 (6.7)  $E2 \gamma$  (or  $E1, M1, E3$ )\*

\*From (ext 6.7 prs)/(ext 6.1 prs) =  $0.51 \pm 0.04$   
 (int 6.7 prs)/(int 6.1 prs) =  $0.47 \pm 0.03$

R.D.Bent, T.W.Bonner, J.H.McCrary, W.A. Ranken, Phys. Rev. 100, 771 (1955).

$C^{15}$   $\tau$  2.25<sup>s</sup>  $C^{14} (\geq 1.3\text{-Mev } d, p)$   
 6 9  $\beta^-$  80% 4.3 Compared to thick  
 2.4<sup>s</sup> 20% 9.8  $Pr^{144}$  source scin

$\gamma(N^{15})$  100† 5.3  
 No 1.9  $\gamma$  (<10†) No other  $\gamma$  (<5†)

R.A.Douglas, B.Gasten, J.Downey, A.Mukerji, Bull. Am. Phys. Soc. 1, No. 1, 21, DA13 (1956); verbal report.

$C^{14}(d, p)2.4^sC$   $E_d = 0.6$  to  $3.0$   
 Previously reported activity for  $E_d < 1.3$   
 ascribed to  $O^{18}(d, \alpha)7.4^sN^{16}$ , i.e.  $Q \neq 0.15$

N.A.Bostrom, E.L.Hudspeth, I.L.Morgan, Bull. Am. No. 2, 94, M12 (1956).

$N^{13}$   $\tau$  10.08<sup>m</sup> 4  $C^{12}(14.1\text{-Mev } d, n)$   
 7 6 10<sup>m</sup> D.H.Wilkinson, Phys. Rev. 100, 32 (1955).

$N^{13}$  Level  $C^{12}(d, n)$   $E_d = 2.68, 3.26$   
 7 6 32, 31† g.s.  
 † $\sigma$ (peak) for above  $E_d$  respectively.  $\sigma$ 's for  
 $C^{13}, N^{13}$  show g.s. reduced widths ~ same.

R.E.Beneson, K.W.Jones, M.T.McEllistrem, Phys. Rev. 101, 308 (1956).

Level  $N^{14}(p, d)$   $E_p = 18.7$   
 ~5† g.s.  $I_n = 1$  p, d( $\theta$ )  
 2.37 level not seen [ $\sigma(14^\circ \text{ c.m.}) < 0.4$  mb/sterad]  
 † $\sigma(18^\circ \text{ c.m.})$  in mb/sterad

K.G.Standing, Phys. Rev. 101, 152 (1956).

Level  $C^{12}(d, n)$   $E_d = 2.8$  to  $3.9$ ; VdG  
 2.37 2 thresh n, ~ $0^\circ$   
 Graph of  $\sigma(\sim 0^\circ)$  given for n yield

J.B.Marion, T.W.Bonner, C.F.Cook, Phys. Rev. 100, 847 (1955).

Levels  $B^{10}(\alpha, n)$   $E_\alpha \sim 8$   
 2.4 3 p recoil,  
 3.6 3 thresh n; ~ $0^\circ$   
 4.3 3 ?  
 5.0 3

g.s. Q of 1.1 assumed

A.R.Quinton, W.T.Doyle, Phys. Rev. 101, 669 (1956).

Levels  $C^{12}(p, p)$   $E_p = 4.0$  to  $5.5$   
 Level  $\frac{J}{\Gamma}$  s  
 6.371  $5/2^+$  0.012 p, p( $\theta$ )  
 6.90  $3/2^+$  0.100

C.W.Reich, G.C.Phillips, J.L.Russell, R.R. Henry, Bull. Am. Phys. Soc. 1, No. 2, 96, N9 (1956); verbal report.

$N^{14}$  Levels  $B^{11}(\alpha, n)$   $E_\alpha \sim 8$   
 7 7 g.s.  $Q = 0.0$  3 p recoil,  
 2.0 3 thresh n; ~ $0^\circ$   
 3.15 30  
 3.85 30  
 4.8 3

A.R.Quinton, W.T.Doyle, Phys. Rev. 101, 669 (1956).

Level  $O^{16}(d, \alpha)$   $E_d = 5.5$  to  $7.5$   
 2.31  $s \pi$  5 angles  
 Weak  $\alpha$  group to this level established

C.P.Browne, Phys. Rev. 100, 1253A (1955); verbal report.

Level  $N^{14}(p, p'\gamma)$   $E_p = 19$   
 $\gamma$  (2.31)  $\tau < 0.35 \mu s$  scin  
 Doppler effect  $\Delta E/E \sim 0.009$  (~ maximum possible)

R.Sherr, J.B.Gerhart, H.Horie, W.F.Hornyak, Phys. Rev. 100, 945 (1955).

$N^{14}$ 7 7	Level	$C^{(12)}(He^3, p\gamma)$	$E_{He^3} = 1.55$
		<u>3.95 level</u>	
		$3.95\gamma/1.64\gamma = 0.048$	$D, \gamma$

H.E.Gove, A.E.Litherland, E.Almqvist, D.A. Bromley, Bull. Am. Phys. Soc. 1, No. 4, 196 N3 (1956); verbal report.

Level	$C^{13}(d, n)$	$E_d = 0.4$ to 4.2; VdG
	<u>5.683 7</u>	$J = 1^{+}$ thresh n,
		*Slow rise suggests p-wave n's $\sim 0^\circ$
		Graph of $\sigma(\sim 0^\circ)$ given for n yield

$C^{(12)}(d, n)$	$E_d = 2.8$ to 3.9; VdG
<u>13.16</u>	$J = 0^{-}, 1^{-}$

\*\*Increase of fast n's implies s-wave to g.s.  
Graph of  $\sigma(\sim 0^\circ)$  given for n yield

J.B.Marion, T.W.Bonner, C.F.Cook, Phys. Rev. 100, 847 (1955).

Levels	$C^{13}(p, D)$	$E_p = 1.5$ to 3.4
	<u>9.39</u>	several angles
	<u>9.51</u>	<u>10.29</u>
	<u>9.70</u>	<u>10.43</u>

D.Zipoy, K.Famularo, G.D.Freier, Bull. Am. Phys. Soc. 1, No. 1, 9, AB3 (1956).

Levels	$C^{(12)}(d, d)$	$E_d = 2.4$ to 3.4
	<u>12.309</u>	$J = 4^{-}$ <u>170^\circ</u>
	<u>12.608</u>	$J = 3^{+}$

M.T.McEllistrem, Phys. Rev. 100, 1253A (1955).

Levels	$B^{10}(\alpha, n)$	$E_\alpha = 1.9$ to 5.3
	$B^{10}(\alpha, p\gamma)$	
	Level $\Gamma$	Level $\Gamma$
	<u>13.15</u> 0.03	<u>14.4^\circ</u> $\sim 0.15$
	<u>13.22</u> 0.10	<u>14.85</u> $\sim 0.13$
	<u>13.68</u> 0.20	<u>15.44</u> $\sim 0.10$
	<u>14.1^\circ</u> $\sim 0.50$	

\*Observed only for  $\alpha, p\gamma$  reaction

T.W.Bonner, A.A.Kraus, Jr., J.B.Marion, J.P. Schiffer, Bull. Am. Phys. Soc. 1, No. 2, 96, M6 (1956).

(a)	$C^{(12)}(d, n) 10^{13} N^{13}$	$E_d = 20$
(b)	$C^{(12)}(d, t) 20^{13} C^{11}$	stacked
	No resonances observed	foils
	Compound nucleus picture predicts for	
	increasing $E_d$ faster fall of $\sigma(a)$ , slower	
	rise of $\sigma(b)$ than observed	

D.H.Wilkinson, Phys. Rev. 100, 32 (1955).

$N^{15}$ 7 8	Level	$C^{13}(d, \alpha)$	$E_d = 1.6$ to 2.3
		Level $\Gamma$	$\Gamma$
		<u>17.71</u> 0.055 10	
		<u>18.06</u> 0.022 4	3, (4?) <sup>*</sup>
			$d, \alpha(\theta)$

$C^{13}(d, t)$   $E_d = 1$  to 3  
18.06 level not observed

J.B.Marion, G.Weber, Bull. Am. Phys. Soc. 1, No. 2, 94, M11 (1956); verbal report.

Level	$O^{(16)}(\gamma, p\gamma)$	$E_\gamma \geq 21$
$\gamma$	(6.33)	scin
	No other $\gamma$ (<20% of 6.33 $\gamma$ )	See also $O^{15}$

N.Svantesson, Bull. Am. Phys. Soc. 1, No. 1, 28, GA3 (1956).

Levels	$N^{14}(d, p)$	EA
	(7.31) $Q = 1.308$ 12	
	(7.58) $= 1.045$ 12	
	(8.32) $= 0.2958$ 6	
	(8.57) $= 0.038$ 10	

R.Chiba, R.A.Douglas, J.W.Broer, D.F.Herring, E.A.Silverstein, Phys. Rev. 100, 1253A (1955); verbal report.

Capture $\gamma$ 's	$N^{(14)}(th\ n, \gamma)$	$37^\circ$ $DR$
15 $\dagger$	<u>3.520</u> 20	17 $\dagger$ <u>6.323</u> 8
17 $\dagger$	<u>3.669</u> 16	9 $\dagger$ <u>7.305</u> 12
16 $\dagger$	<u>4.497</u> 11	4 $\dagger$ <u>8.313</u> 13
22 $\dagger$	<u>5.259</u> 8	0.2 $\dagger$ <u>8.34</u> 4
35 $\dagger$	<u>5.288</u> 7	0.2 $\dagger$ <u>9.03</u> 3
18 $\dagger$	<u>5.534</u> 8	1 $\dagger$ <u>9.145</u> 10
14 $\dagger$	<u>5.543</u> 8	12 $\dagger$ <u>10.833</u> 8

No 7.164  $\gamma$  (< 0.8 $\dagger$ )

$\dagger$ Photons/100 N radiative captures

P.J.Campion, G.A.Bartholomew, Bull. Am. Phys. Soc. 1, No. 1, 28, GA2 (1956); verbal report.

Levels	$B^{11}(\alpha, n)$	$E_\alpha = 1.9$ to 5.3
	Level $\Gamma$	Level $\Gamma$
	<u>12.50</u> 0.059	
	<u>12.90</u> 0.090	<u>13.72</u> 0.040
	<u>13.14</u> < 0.003	<u>13.86</u> 0.070
	<u>13.17</u> $\sim 0.007$	<u>14.11</u> $\sim 0.010$
	<u>13.36</u> 0.025	<u>14.17</u> 0.035
	<u>13.59</u> 0.020	<u>14.66</u> 0.072

T.W.Bonner, A.A.Kraus, Jr., J.B.Marion, J.P. Schiffer, Bull. Am. Phys. Soc. 1, No. 2, 96, M6 (1956).

Levels	$C^{13}(d, n)$	$E_d = 0.4$ to 4.2; VdG
	<u>17.80</u> 5	$\Gamma \sim 0.6$ thresh n,
	<u>18.27</u> 3	$\sim 0.4$ $\sim 0^\circ$
	<u>19.15</u> 3	$\sim 0.15$

J.B.Marion, T.W.Bonner, C.P.Cook, Phys. Rev. 100, 847 (1955).



$N^{16}$   
7 9  
7<sup>s</sup>  $\gamma(O^{16})$  6.1  $O^{18}(1.3\text{-Mev } d, \alpha)$  8<sup>0</sup>15  
7 scin  
No 1.0  $\gamma$   
 $\sigma[O^{18}(d, \alpha)]/\sigma[C^{14}(d, \gamma)] > 400$  at  $E_d = 1.3$  for  $7^sN$

N.A. Bostrom, E.L. Hudspeth, I.L. Morgan, Bull. Am. Phys. Soc. 1, No. 2, 94, M12 (1956); verbal report.

Levels  $C^{14}(d, p)2.4^sC^{15}$   $E_d = 1.3$  to  $3.0$   
12.26  $\Gamma > 0.1$   
12.86  $\Gamma > 0.1$

R.A. Douglas, B. Gasten, J. Downey, A. Mukerji, Bull. Am. Phys. Soc. 1, No. 1, 21, DA13 (1956).

$O^{14}$   
8 6  
72<sup>s</sup>  $\beta^+$  (4.1) sl  
 $4.1\beta^+ / 1.84\beta^+ = 0.60 \pm 0.10\%$

R. Sherr, J.B. Gerhart, H. Horie, W.F. Hornyak, Phys. Rev. 100, 945 (1955).

$O^{14}$   
8 6 Level  $C^{12}(He^3, n)$   $E_{He^3} \leq 2.0$   
g.s.  $Q = -1.148$  4

J.W. Butler, Bull. Am. Phys. Soc. 1, No. 2, 94, M8 (1956); verbal report.

$O^{15}$   
8 7 Level  $N^{14}(d, n)$   $E_d = 1.85$ ;  $d, n(\theta)$   
g.s.  $Q = 5.21$  7  $i_p = 1$

I. Nonaka, S. Morita, N. Kawai, T. Ishimatsu, S. Suematsu, K. Takeshita, Y. Nakajima, Y. Wakuda, J. Phys. Soc. Japan 11, 1 (1956).

Level  $O^{16}(\gamma, n\gamma)$   $E_\gamma \geq 21$   
 $\gamma$  (6.14) scin  
No other  $\gamma$  ( $< 20\%$  of 6.14  $\gamma$ ) See also  $N^{15}$

N. Evariantsson, Bull. Am. Phys. Soc. 1, No. 1, 28, GA3 (1956); verbal report.

Levels  $N^{14}(d, n)$   $E_d = 1.0$  to  $4.5$ ; VdG  
1<sup>+</sup> 6.20 3 thresh  $n, \sim 0^\circ$   
4.6<sup>+</sup> 6.841 9  
0.9<sup>+</sup> 6.909 9

Graph of  $\sigma(\sim 0^\circ)$  given for  $n$  yield  
†Relative slow- $n$  intensities at thresholds

J.B. Marion, R.M. Brugger, T.W. Bonner, Phys. Rev. 100, 46 (1955).

Level  $N^{14}(p, p)$   $E_p = 0.95$  to  $3.96$   
10.33 s pc,  $132^\circ$

S. Bashkin, R.R. Carlson, J.A. Jacobs, Bull. Am. Phys. Soc. 1, No. 4, 212 SA9 (1956).

Levels  $C^{12}(He^3, p)$   $E_{He^3} = 1.0$  to  $2.5$   
13.06  $He^3, p(\theta)$  varies rapidly  
13.52 with  $E_{He^3}$  for all  
13.96  $p$  groups

$C^{12}(He^3, n)$

$\sigma(n)/\sigma(p)$  rises, then levels off  
 $He^3, p(\theta)$  and  $He^3, n(\theta)$  similar

D.A. Bromley, H.E. Gove, A.E. Litherland, E.B. Paul, E. Almqvist, Bull. Am. Phys. Soc. 1, No. 4, 195 N2 (1956); verbal report.

$O^{16}$   
8 8 Levels  $O^{16}(p, p')$   $E_p = 19, 10$  angles  
 $\int d\sigma$  in mb Level Coincidences J  
59 6.14 2  
34 7.02 2  
28 8.87 3  $p'(\sim 2.4^\circ, \sim 6, \sim 7\gamma)$  2<sup>-</sup> (3<sup>+</sup>?)  
8 9.85 3 \*2.78 4 in singles  
8 10.34 3  
19 11.08 3  $p'(\sim 6, \sim 7\gamma)$  2<sup>-</sup> (3<sup>+</sup>?)  
11 11.51 3  
6 12.02 3  $p'\gamma$   
11 12.53 3  $p'(4.4\gamma$  in  $C^{12}?)$   
 $\sim 10$  13.06 3  
13.39 scin p

$p, p'(\theta)$  given for all but last two groups

W.F. Hornyak, R. Sherr, Phys. Rev. 100, 1409 (1955); 99, 632A (1955).

Levels  $O^{16}(\gamma, \gamma)$   $\gamma$ 's from  $F^{19}(p, \alpha\gamma)$   
(6.91)  $\tau = 2.3^{+2.9}_{-0.9} \times 10^{-14}s$   
scin  
(7.12)  $\tau = 7^{+12}_{-3} \times 10^{-15}s$

C.P. Swann, F.R. Metzger, Bull. Am. Phys. Soc. 1, No. 4, 211 SA6 (1956); verbal report.

Levels  $N^{15}(p, \alpha\gamma)$   $E_p = 0.80$  to  $3.80$   
Level  $\Gamma$  (kev) scin 4.43  $\gamma$ ,  
12.95  $p, \gamma(\theta)$   
13.09 125 15  
13.25  
13.67 65 10  
13.98 2 25 5 J  
14.92 3 45 10 4<sup>+</sup>  
15.20 4 75 15 2<sup>-</sup>, 3<sup>+</sup>  
15.25 5 700  
15.41 4 100 25 2<sup>+</sup> probable  
 $N^{15}(p, \gamma)$  reaction shows 13.09 level only

R.R. Carlson, S. Bashkin, Bull. Am. Phys. Soc. 1, No. 4, 211 SA7 (1956); verbal report.

Levels  $N^{15}(p, \alpha_o)$   $E_p = 0.95$  to  $3.80$   
13.09 pc,  $132^\circ$   
13.25  
50† 14.91 2  
 $\sim 50$ † 15.25 broad  
100† 15.39 3  
13.67, 13.98, 15.20 levels not observed  
†Total  $\sigma$  in mb

J.A. Jacobs, S. Bashkin, R.R. Carlson, Bull. Am. Phys. Soc. 1, No. 4, 212 SA8 (1956); verbal report.

$O^{16}$ 8 8	Levels	$N^{15}(p, \alpha_1 \gamma)$		$E_p = 0.8$ to 3.2 scin $\gamma$
		Level	$\Gamma$ (kev)	
	0.8†	13.235	22.5	
	1†	13.666	95 ± 10	
	~0.1†	13.976	< 30	
	1.1†	14.922	90 ± 20	

No level at 14.2

†Relative yield of  $C^{12}$  4.4%

R.R. Carlson, S. Bashkin, Phys. Rev. 100, 1254A (1955); verbal report.

Levels	$N^{15}(p, \alpha \gamma)$		$E_p = 2.65$ to 5.25 scin 4.43%
	Level	$\Gamma$ (kev)	
	14.92	60	
	15.19	60	
	15.40	95	
	15.79	30	
	16.43	25	

L. Lidofsky, K. Jones, R. Bent, J. Weil, T. Kruse, M. Bardon, W. W. Havens, Jr., Bull. Am. Phys. Soc. 1, No. 4, 212 SA10 (1956).

Levels*		$O^{16}(\gamma, n) 2.0^{15}O$		$E_\gamma \leq 23.2$	
$\int \sigma dE$	Level	$\int \sigma dE$	Level	$\int \sigma dE$	Level
0.0046	15.85	0.182	17.68	0.617	20.79
0.040	16.03	0.254	17.84	0.857	20.93
0.027	16.47	0.059	18.04	1.36	21.21
0.041	16.75	0.094	18.70	0.853	21.52
0.084	16.95	0.130	19.01	2.21	22.37
0.111	17.02	0.396	19.18	3.14	22.54
0.262	17.13	0.495	20.33	3.47	22.76
0.404	17.18	0.603	20.58	3.06	23.02
0.202	17.55				

Estimates of  $\Gamma_\gamma$  show levels  $\leq 19.2$  are E2

excited, 22 to 23 are E1 excited

\* Sharp breaks in activation curve

A. S. Penfold, B. M. Spicer, Phys. Rev. 100, 1377 (1955).

Levels in $O^{16}, C^{12}, Be^8$		$O^{16}(\gamma, 4\alpha)$		$E_\gamma \leq 70$ , dpl	
$E_\gamma$	$O^{16}$	$C^{12}$	$Be^8$	connected by $\alpha$ emission	
< 25	22.3	9.6 ?	g.s., not 2.9		
		10.8	g.s., not 2.9		
		12.3 ? 3	not g.s.		
25 to 28	26 27.5	15 to 16	?, not 4.1		
28 to 35	29.5 32.5 35	16 18 to 19	2.9 323 stars		

W. K. Dawson, D. Livesey, Can. J. Phys. 34, 241 (1956).

Level	$C^{12}(\alpha, \alpha_0 \text{ or } \alpha_1)$	$E_\alpha = 20.4$ to 22.6; s
	23.54 10	$\alpha, \alpha_1(\theta)$ not symmetric about 90° c.m.

V. K. Rasmussen, D. W. Miller, M. B. Sampson, Phys. Rev. 100, 181 (1955).

$O^{16}$ 8 8	$N^{(14)}(d, p + 7.31 \gamma)$	$E_d = 2.4, 4.0, 5.3$
	$N^{(14)}(d, n + 6.82 \gamma)$	sl pr
	$\sigma(d, p \gamma) / \sigma(d, n \gamma) = 2.6, 1.5, 0.9$ for above $E_d$	

R. D. Bent, T. W. Bonner, J. H. McCrary, W. A. Ranken, Phys. Rev. 100, 771 (1955).

$O^{17}$ 8 9	Levels	$O^{16}(d, p)$ g.s. (0.872)	$E_d = 1.05$ to 2.51 scin, 5° to 160°
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d, p( $\theta$ ) of stripping type except near resonance ( $E_d = 1.7$ ) where curves are flattened

J. C. Grosskreutz, Phys. Rev. 101, 706 (1956).

Levels	$C^{13}(\alpha, n)$		$E_\alpha = 0.83$ to 3.52	
	J	Level $\Gamma$ (kev)	J	Level $\Gamma$ (kev)
	5/2	7.162 < 8		8.341 20
	5/2?	7.375 < 5	5/2	8.400 < 15
		7.570 < 15	1/2	8.467 20
		7.679 30		8.498 < 15
		7.93 150	1/2	8.70 90
		8.06 80		8.89 130
		8.21 75	5/2	8.96 70
			$\alpha, n(\theta)$	

R. B. Walton, J. D. Clement, Bull. Am. Phys. Soc. 1, No. 4, 211 SA5 (1956); verbal report.

Levels	$C^{13}(\alpha, n)$		$E_\alpha = 2.0$ to 5.2	
	Level	$\Gamma$ (kev)	Level	$\Gamma$ (kev)
	7.94	120	9.13	$\leq 20$
	8.08	80	9.197	$\leq 20$
	8.20	80	9.499	$\leq 20$
	8.34	$\leq 20$	9.72	30
	8.40	$\leq 20$	9.78	70
	8.467	$\leq 20$	9.88	$\leq 20$
	8.504	$\leq 20$	9.97	170
	8.70	90	10.05	100
	8.89	140	10.20	65
	8.96	30		

Resonance  $\sigma$ 's ( $0^\circ$  to  $10^\circ$ ) are 1 to 30 mb/sterad

J. P. Schiffer, T. W. Bonner, A. A. Kraus, Jr., J. B. Marion, Bull. Am. Phys. Soc. 1, No. 1, 20 DA3 (1956).

Levels	$C^{13}(\alpha, n)$		$\alpha, n(\theta)$	
	J	Level	J	Level
	3/2	(8.19)	7/2	(9.50)
		5/2 (8.40)	7/2	(9.72)
	3/2(5/2?)	(8.50)	9/2	(9.88)
	3/2(?)	(8.70)	7/2	(9.97)
	3/2	(8.89)	long counter	

J. P. Schiffer, A. A. Kraus, Jr., J. R. Risser, Bull. Am. Phys. Soc. 1, No. 4, 211 SA3 (1956); verbal report.

$O^{18}$ 8 10	Levels	$F^{19}(n, d)$		$E_n = 14.1$ pc
		st	g.s. $Q = -5.79$ s	
			$i_p = 0$	$n, d(\theta)$
		w 1.9	$i_p = 2(1?)$	
	No other levels below 3.0			

F. L. Ribe, Phys. Rev. 100, 1254A (1955).

$O^{18}$ 8 10	Level	$O^{18}(p,p')$	$E_p = 4.58, 5.28$ 877	$F^{18}$ 9 9
		1.981 4		
	2.445 level not observed			

R.R.Spencer, G.C.Phillips, J.P.Schiffer, T.E. Young, Bull. Am. Phys. Soc. 1, No. 2, 95, M13 (1956).

Levels	$F^{19}(t,\alpha)$	$E_t = 1.8$ sd; $90^\circ$
	1.989 24	
	3.504 34	5.311 40
	3.929 40	5.456 40
	5.007 40	6.190 40
	5.170 40	6.328 40

N.Jarmie, Bull. Am. Phys. Soc. 1, No. 1, 28, GA4 (1956); verbal report.

$F^{16}$ 9 7	$N^{14}(He^3,n)$	$E_{He^3} \leq 2.0$
	Reaction not observed, g.s. $Q < -1.65$	

J.W.Butler, Bull. Am. Phys. Soc. 1, No. 2, 94, M8 (1956).

$F^{17}$ 9 8	Levels	$O^{16}(d,n)$	$E_d = 1.8$ to 4.3; VdG
		g.s. $Q = -1.626$ 4	thresh n,
		0.499 3	$\sim 0^\circ$
	Graph of $\sigma(\sim 0^\circ)$ given for n yield		

J.B.Marion, R.M.Brugger, T.W.Bonner, Phys. Rev. 100, 46 (1955).

Levels	$O^{16}(p,p)$	$E_p = 2.5$ to 5.6
	3.10 $J = 1/2^-$	5.45 $\Gamma \sim 0.60$
	3.86	5.66 $\sim 0.50$
	$\sim 4.7$ $\Gamma \sim 1.0$	5.83 $\sim 0.60$
	*From $\sigma(90^\circ)$ as $f(E_p)$	

R.R.Henry, G.C.Phillips, C.W.Reich, J.L. Russell, Bull. Am. Phys. Soc. 1, No. 2, 96, N6 (1956).

$F^{18}$ 9 9	Level	$F^{19}(p,d)$	$E_p = 18.9$
		8.5† g.s. $Q = -8.12$ 20	
		$\dagger \sigma(11^\circ)$ in mb/sterad $I_n = 0$	$p,d(\theta)$

J.B.Reynolds, K.G.Standing, Phys. Rev. 101, 158 (1956); 95, 639A (1954).

Levels	$O^{16}(He^3,py)$	$E_{He^3} = 2.0$ scin
$\gamma$	0.94°	
	1.06°	2.10
	1.69	2.49

\* $O^{18}(p,n\gamma)$  thresholds confirm these levels

J.W.Butler, H.D.Holmgren, W.E.Kunz, Bull. Am. Phys. Soc. 1, No. 1, 29, GA5 (1956); verbal report.

Levels	$O^{16}(d,n)$	$E_d = 1.8$ to 4.3; VdG
	9.5	10.4 thresh n,
	9.6	10.6 $\sim 0^\circ$
	9.7 $J = 2^+, 3^{++}$	10.8
	10.1	11.0
	10.3	11.2

\*Increase of fast n's implies s wave to g.s.

J.B.Marion, R.M.Brugger, T.W.Bonner, Phys. Rev. 100, 46 (1955).

Level	$O^{16}(d,\alpha)$	$N^{14}$ 2.31 level
	$\sim 14.5$	from resonance at $E_d \sim 7$

C.P.Browne, Phys. Rev. 100, 1253A (1955); verbal report.

$F^{19}$ 9 10	Levels	$F^{19}(p,p'\gamma)$	$E_p = 0.873, 0.935$
	$\gamma$	(0.109) $\alpha_K = 0.00210$ 45 E1 sl,	
		(0.197) $\alpha_K = 0.00191$ 60 E2 scin	
	Used $K/L = 8$ ; corrected for anisotropy		

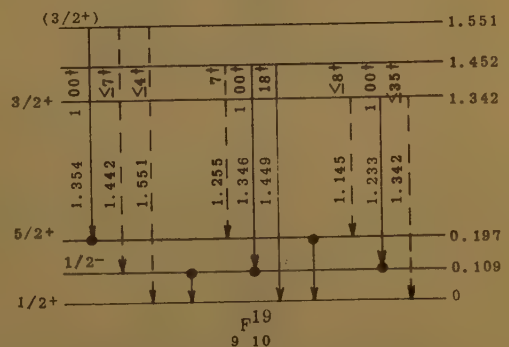
W.R.Mills, Jr., H.H.Hilton, III, C.A.Barnes, Phys. Rev. 100, 1794A (1955).

	$F^{19}(p,p'\gamma)$	$\gamma\gamma(\theta,H)$
	$\mu(0.197 \text{ level}) = +3.4$ 9	( $g = -1.90$ possible)
	Gyromagnetic ratios of 1.35 and -1.90 fit data.	

P.B.Treacy, Nature 176, 923 (1955).

$\gamma$	$F^{19}(p,p'\gamma)$	$E_p = 2.4$ to 4.1
	(0.110)	scin $\gamma\gamma$ , scin pr
	(0.197)	1.346 10
	1.233 10	1.354 10
	1.255 ?	1.449 10

No 1.145  $\gamma$ , 1.442  $\gamma$ , 1.551  $\gamma$   
(0.110  $\gamma$ )(1.233, 1.346  $\gamma$ ) No (0.110  $\gamma$ )(1.45  $\gamma$ )  
(0.197  $\gamma$ )(1.354  $\gamma$ ) delay observed



†Relative number of transitions from level

B.J.Toppel, D.H.Wilkinson, D.E.Alburger, Phys. Rev. 100, 1254A (1955); 101, 1485 (1956).



$F^{19}$ 9 10	Level	$F^{19}(p,p'\gamma)$	$E_p = 4.3$	$Ne^{19}$ 10 9	Levels
		1.55 level			$F^{19}(p,n)$
	$\gamma$	1.35 4	scin		g.s. $Q = -4.022$ 5 thresh n,
		(1.35 $\gamma$ )(0.197 $\gamma$ ) delay = 85 $\mu$ s (half life)			0.241 4 $\sim 0^\circ$
					0.280 4
		M. Fiehrer, P. Lehmann, A. Lévy, R. Pick, Compt. rend. 241, 1746 (1955).			No other level below 1.5

Graph of  $\sigma(\sim 0^\circ)$  given for n yield

J. B. Marion, T. W. Bonner, C. F. Cook, Phys. Rev. 100, 91 (1955).

$F^{20}$ 9 11	Capture $\gamma$ 's	$F^{19}(th\ n, \gamma)$	$s\pi$ pr	$Ne^{20}$ 10 10	Levels
	45†	4.07 2	22† 5.54 2		$F^{19}(d,n)$
	13†	5.10 2	15† 6.018 1†		Level $I_p$
	25†	5.28 2	29† 6.599 1†		g.s. 0
					(1.63) 2
					$\sim 7.3$ 0 and 2
					(9.3) 1
		†Photons/100 F captures			

P. J. Campion, G. A. Bartholomew, Bull. Am. Phys. Soc. 1, No. 1, 28, GA2 (1956); verbal report.

					$E_d = 9.06$
					scin n
					d, n( $\theta$ )

J. M. Calvert, A. A. Jaffe, E. E. Maslin, Proc. Phys. Soc. 68A, 1017 (1955).

Levels	$F^{19}(n,n)$	$Li(p,n)$
$E_c$	Level $I_n$	J
28	6.627 1	1 <sup>-</sup> or 2 <sup>-</sup>
50	6.648 1	1 <sup>-</sup>
99	6.694 1	1 <sup>-</sup>

R. C. Block, H. W. Newson, Bull. Am. Phys. Soc. 1, No. 1, 55, R3 (1956).

Levels	$Ne^{20}(p,p')$	$E_p = 18$
	1.63	7.45
	4.26	7.85
	4.97	9.20
	5.81	10.0

$p, p'(\theta)$  studied for the above levels.

G. Schrank, G. K. O'Neill, Bull. Am. Phys. Soc. 1, No. 1, 29, GA7 (1956).

Levels	$F^{19}(n, \alpha) ^7Li^{16}$	$E_n = 3.0$ to 8.0
	9.8	90+ 10.51 5
50+	10.03 5	170+ 10.61 5
60+	10.11 5	190+ 11.22 5
40+	10.18 5	270+ 12.2 1

†Peak  $\sigma$  in mb

J. B. Marion, R. M. Brugger, Phys. Rev. 100, 69 (1955).

Levels	$F^{19}(p, \gamma)$	$s\pi, p$ res. calibr.
	13.193	$E_p = 0.3404$ 3
	13.698	$E_p = 0.8712$ 4

F. Bumiller, H. H. Staub, Helv. Phys. Acta 28, 355A (1955).

Levels	$O^{18}(d, \alpha)$	$E_d = 0.7$ to 3.0
76†	13.59 1	$\Gamma \sim 0.50$
87†	13.90 1	$\sim 0.40$
79†	14.25 1	$\sim 0.30$
100†	14.94 1	$> 0.60$

N. A. Bostrom, E. L. Hudspeth, I. L. Morgan, Bull. Am. Phys. Soc. 1, No. 2, 94, M12 (1956).

Levels	$F^{19}(p, \alpha\pi)$	$E_p = 1.3$ to 5.5
	15.86 $\Gamma \sim 0.16$	sl pr
	16.06 = 0.09	16.60 $\Gamma = 0.27$
	16.20 = 0.10	16.98 = 0.10

14 additional levels observed for above  $E_p$

W. A. Ranken, J. H. McCrary, T. W. Bonner, Bull. Am. Phys. Soc. 1, No. 2, 95, N1 (1956).

$F^{21}$ 9 12	Levels	$F^{19}(t, p)$	$E_t = 1.8$
		g.s. $Q = 6.199$ 30	sd; 90°
		0.269	
		1.087	
		1.694	
		2.036	

N. Jarmie Bull. Am. Phys. Soc. 1, No. 1, 28, GA4 (1956); verbal report. Phys. Rev. 99, 1043 (1955).

$Ne^{21}$ 10 11	$O^{18}(\alpha, n)$	Po $\alpha$ 's, $E_\alpha = 2.4$ to 5
	No resonances observed	$EF_3$

R. R. Roy, A. Lagasse, M. L. Goes, R. Moerman, Compt. rend. 241, 1567 (1955).

$Ne^{23}$ 10 13	$\beta^-$	3.9 3	$Na^{23}(\text{fast } n, p); \text{scin}$
	$\gamma(Na^{23})$	36% 0.440 5	scin $\beta\gamma/\beta$
		$\leq 3.4\% \sim 1.7$	

H. J. Gerber, M. G. Muñoz, D. Naeder, Helv. Phys. Acta 28, 478A (1955); Phys. Rev. 101, 774 (1956).

Na <sup>22</sup> 11 11	Levels	F <sup>19</sup> ( $\alpha$ , n)	E <sub><math>\alpha</math></sub> = 8.15
		g.s. Q = -2.0 2	a p-recoil
		0.45 20	thresh n, $\sim 0^\circ$
		1.15 20	2.25 20
		1.8 2 ?	3.0 2

A.R. Quinton, W.T. Doyle, Phys. Rev. 101, 669 (1956); 97, 252A (1955).

Levels	Ne <sup>(20)</sup> (d, p)	E <sub>d</sub> = 0.8 to 1.1
	12.07	p's to Ne <sup>21</sup> 0.35 level
	12.13	p's to Ne <sup>21</sup> 1.73 level
No resonance for p's to Ne <sup>21</sup> 2.84 level a pc		

S. Gorodetzky, T. Muller, M. Port, Compt. rend. 240, 1704, 2224 (1955).

Na <sup>23</sup> 11 12	Level	Na <sup>23</sup> (p, p')	E <sub>p</sub> = 4.6 to 5.6
		0.437 5	87

J.P. Schiffer, C.R. Gossett, G.C. Phillips, T.E. Young, Bull. Am. Phys. Soc. 1, No. 2, 95, N2 (1956).

$\gamma$	Na <sup>23</sup> (n, n')	E <sub>n</sub> = 5.1
	0.43	1.64 scin
	0.66	2.07

I.L. Morgan, Bull. Am. Phys. Soc. 1, No. 2, 96, N11 (1956); verbal report.

Level	Na <sup>23</sup> (p, p')	E <sub>p</sub> = 1.288
	(0.440) J = 5/2 <sup>+</sup>	p, $\gamma$ ( $\theta$ )
*From p, $\gamma$ ( $\theta$ ), assuming p- and f-wave protons and channel spin 2		

R.W. Krone, W.G. Read, Bull. Am. Phys. Soc. 1, No. 4, 212 SA11 (1956).

Level	Na <sup>23</sup> (p, p')	E <sub>p</sub> = 1.288
	(0.440) $\tau < 14 \mu\text{s}$	recoil

C.P. Swann, W.C. Porter, Bull. Am. Phys. Soc. 1, No. 1, 29, GA11 (1956); verbal report.

Na <sup>24</sup> 11 13 15 <sup>h</sup>	$\beta^-$	1.400	$s\pi\beta, \beta\gamma$
	F-K linear (E <sub><math>\beta</math></sub> > 0.450)		
E.F. De Haan, G.J. Sizoo, Physica 21, 818 (1955).			

$\gamma$ (Mg <sup>24</sup> )	(1.38)	4.01	scin
	(2.75)	5.3	

F.M. Tomnovec, C.S. Cook, Phys. Rev. 100, 1254A (1955); verbal report.

Na <sup>24</sup> 11 13 15 <sup>h</sup>	$\beta$ (1.38 $\gamma$ ) delay = 25 $\mu\text{s}$ 17	scin
	C.F. Coleman, Phil. Mag. 46, 1135 (1955).	

Na <sup>24</sup> 11 13	Resonance peak	Na <sup>23</sup> (n, n)	Li(p, n)
		0.053 J = 3 <sup>-</sup> or 2 <sup>-</sup> ? l <sub>n</sub> = 1	n, n( $\theta$ )

R.C. Block, H.W. Newson, Bull. Am. Phys. Soc. 1, No. 1, 55, R3 (1956).

Resonance peaks	Na <sup>23</sup> (n, n')	E <sub>n</sub> = 0.44 to 0.80
	0.542	scin 0.440 $\gamma$
	0.602 <sup>*</sup>	0.710 <sup>*</sup>
	0.633 <sup>§</sup>	0.780 <sup>§</sup>
*n, $\gamma$ isotropic $\S$ n, $\gamma$ anisotropic		

H. Hausman, J.E. Monahan, F.P. Mooring, S. Raboy, Bull. Am. Phys. Soc. 1, No. 1, 56, R7 (1956); verbal report.

Na <sup>25</sup> 11 14 62 <sup>s</sup>	$\gamma$ (Mg <sup>25</sup> )	Mg <sup>(25)</sup> (14-Mev p, n)
	95 $\dagger$ 0.40	100 $\dagger$ 0.98 scin
	98 $\dagger$ 0.58	33 $\dagger$ 1.61
No $\beta^-$ to 0.58 level in Mg <sup>25</sup> (< 1% of $\beta^-$ 's)		

H.E. Gove, A.E. Litherland, E.B. Paul, G.A. Bartholomew, Bull. Am. Phys. Soc. 1, No. 1, 29, GA8 (1956); verbal report.

Mg <sup>24</sup> 12 12	Levels	Na <sup>23</sup> (d, n)	E <sub>d</sub> = 8.4
		g.s. ic p-recoil	
	0.04 $\dagger$	(1.368)	
	0.2 $\dagger$	(4.122)	l <sub>p</sub> = 2
	0.4 $\dagger$	(4.23)	l <sub>p</sub> = 0
	2 $\dagger$		
	0.32 $\dagger$	5.1	
	0.32 $\dagger$	5.5	
	3 $\dagger$	6.3	
	4.3 $\dagger$	7.5	l <sub>p</sub> = 0 and 2
	4.4 $\dagger$	8.4	l <sub>p</sub> = 0
$\dagger$ Peak $\sigma$ in mb/sterad			

J.M. Calvert, A.A. Jaffe, A.E. Litherland, E.E. Maslin, Proc. Phys. Soc. 68A, 1008 (1955).

Levels	Na <sup>23</sup> (p, $\gamma$ )		E <sub>p</sub> $\leq$ 0.53; EA
	Level	E <sub>p</sub>	$\Gamma$ (keV)
	1 $\dagger$ 11.943	0.2508 2	0.3 2
	110 $\dagger$ 11.998	0.3078 3	0.8 3
	2 $\dagger$ 12.061	0.3735 4	2.0 10
	4 $\dagger$ 12.126	0.4438 6	0.8 3
	65 $\dagger$ 12.193	0.5109 6	0.8 3

$\dagger$ Relative  $\gamma$  yield

D.A. Hancock, F. Verdaguer, Proc. Phys. Soc. 68A, 1080 (1955).

$Mg^{24}$ 12 12	Levels	$Na^{23}(p,p)$		$E_p \leq 1.5, 155^\circ; VdG$	
	$E_o$	Level	$\Gamma$ (kev)	$\Gamma_p$ (kev)	J
	0.797	12.477			
	0.815	12.484			
	0.878	12.544	8	6.8	$1^+$
	0.922	12.586			
	1.022	12.682	66 or 50	66 or 50	$2^-$
	1.177	12.831	4	2.8	$1^+$
	1.321	12.969			$3^+$
	1.398	13.042	1	0.7	$3^+$
		$Na^{23}(p,\alpha)$		$E_p \leq 1.5, 155^\circ; VdG$	
	1.288	12.937			
	1.460	13.102			

N.P. Baumann, F.W. Prosser, Jr., R.W. Krone,  
Phys. Rev. 100, 1244A (1955); verbal report.

$Mg^{25}$ 12 23	Levels	$Mg^{25}(p,p'\gamma)$		$E_p = 1.5$ to $2.9$	
		1.61 level			
	$\gamma$	> 96% 1.61			scin
		No 0.63 $\gamma$ , 1.03 $\gamma$ (< 1%, 3% resp. of 1.61 $\gamma$ )			
		1.96 level			
	$\gamma$	(0.40)	55%	1.38	
		(0.58)	28%	1.96	
		17% 0.98			
		(0.58 $\gamma$ )(0.40, 0.98, 1.38 $\gamma$ )			

H.E. Gove, A.E. Litherland, E.B. Paul, G.A.  
Bartholomew, Bull. Am. Phys. Soc. 1, No. 1,  
29, GA8 (1956); verbal report.

Capture $\gamma$ 's	$Mg^{24}(th\ n,\gamma)$	$s\pi\ \pi\ \pi$
5 $\dagger$	2.816 16	
1 $\dagger$	3.408 18	

P.J. Campion, G.A. Bartholomew, Bull. Am. Phys.  
Soc. 1, No. 1, 28, GA2 (1956); verbal report.

Resonance	$Mg^{24}(n)$	$E_n = 0.002$ to $0.35$
peak 60°	0.085	$J = 3/2^-$ Li(p,n)
$\sigma_t$ (peak)		$\Gamma = 0.008$

A. Taylor, H. Marshak, H.W. Newson, Bull. Am.  
Phys. Soc. 1, No. 1, 62 UA3 (1956); verbal  
report.

Resonance	$Mg^{24}(n,n)$	Li(p,n)
peak	0.085	$J = 3/2^-$ n,n( $\theta$ )
	$i_n = 1$	

R.C. Block, H.W. Newson, Bull. Am. Phys. Soc. 1,  
No. 1, 55, R3 (1956).

$Mg^{26}$ 12 14	Capture $\gamma$ 's	$Mg^{25}(th\ n,\gamma)$	$s\pi\ \pi\ \pi$
		8.55 2	10.08 2
		8.93 2	11.086 25

\*In addition to other known  $\gamma$ 's

P.J. Campion, G.A. Bartholomew, Bull. Am. Phys.  
Soc. 1, No. 1, 28, GA2 (1956); verbal report.

$Mg^{26}$ 12 14	Resonance	$Mg^{25}(n)$	$E_n = 0.002$ to $0.35$
	peaks	0.020	$\Gamma \sim 0.001$ Li(p,n)
		0.081	$\sim 0.009$
		0.101	$\sim 0.010$

A. Taylor, H. Marshak, H.W. Newson, Bull. Am.  
Phys. Soc. 1, No. 1, 62, UA3 (1956); verbal  
report.

$Mg^{27}$ 12 15	Levels	$Al^{27}(n,p)$	$E_n = 14$ ; ppl
	< 0.2 $\dagger$	g.s.	several angles
	1 $\dagger$	1.0	
	10 $\dagger$	3.5	
		5.7	

†% of charged particles (p and d)

R.K. Haling, Bull. Am. Phys. Soc. 1, No. 1,  
29, GA9 (1956); verbal report.

Resonance	$Mg^{26}(n)$	$E_n = 0.002$ to $0.35$
peak	$\sim 0.320$	Li(p,n)

A. Taylor, H. Marshak, H.W. Newson, Bull. Am.  
Phys. Soc. 1, No. 1, 62, UA3 (1956); verbal  
report.

$Al^{25}$ 13 12	Capture $\gamma$ 's	$Mg^{24}(p,\gamma)$	$E_p \leq 1.66$ ; scin
		0.45 level	
	$\gamma$	0.43	
		0.95 level $J = 3/2^+$	p, $\gamma$ ( $\theta$ )
	$\gamma$	58 $\dagger$ 0.50 42 $\dagger$ 0.95	
		1.61 level $J = 7/2^+$	p, $\gamma$ ( $\theta$ )
	$\gamma$	$\geq 90^\dagger$ 1.61	
		1.81 level $J = 5/2^+$	p, $\gamma$ ( $\theta$ )
	$\gamma$	30 $\dagger$ 0.86	
		50 $\dagger$ 1.36 20 $\dagger$ 1.81	
		3.44 level $J = 9/2^+$	p, $\gamma$ ( $\theta$ )
	$\gamma$	$\geq 90^\dagger$ 1.61	
		90 $\dagger$ 1.83 10 $\dagger$ 3.44	
		(1.83 $\gamma$ )(1.61 $\gamma$ )	
		3.88 level $J = 5/2^+$	p, $\gamma$ ( $\theta$ )
	$\gamma$	17 $\dagger$ 1.18	
		2.07 ? 6 $\dagger$ 3.43	
		67 $\dagger$ 2.93 10 $\dagger$ 3.88	

G.A. Bartholomew, H.E. Gove, A.E. Litherland, E.  
B. Paul, Bull. Am. Phys. Soc. 1, No. 1, 28,  
GA1 (1956); verbal report; Phys. Rev. 99,  
644A (1955).

$Al^{26}$ 13 13 $\sim 10^{6\gamma}$ g.s.	$Si^{28}(5\text{-Mev } d,\alpha)$	
	$\beta^+$	1 $\dagger$ 1.17 5 $\Delta J = 3$ , no shape scin
	$\gamma(Mg^{26}) \sim 1^\dagger$	1.76 10 scin

M.J. Laubitz, Proc. Phys. Soc. 68A, 1033  
(1955).

$Al^{26}$ 13 13	Level	$Al^{27}(p,d)$	$E_p = 18$ ; p,d( $\theta$ )
	$i_n = 2$ for group to g.s., 0.22, or 0.42 level or all three		

J.B. Reynolds, K.G. Standing, Phys. Rev. 101,  
158 (1956); 95, 639A (1954).



$^{26}_{13}\text{Al}$	Level	$\text{Si}^{(28)}(\text{d}, \alpha)$	$E_d = 5.5 \text{ to } 7.5$	$\text{Si}^{28}_{14}$	Levels	$\text{Al}^{27}(\text{d}, \text{n})$	$E_d = 9.02$
13 13		0.228 5	s	14 14		$\frac{I_p}{2}$	
	Yield decreases from 62% of g.s. group at 15° to 0 beyond 60° for $E_d = 7.03$						
					0.18°	g.s.	ic p-recoil
					0.49+	1.78	0
					0.21+	~4.7	0
					2.3+	~6.4	0
					0.59+	7.10	0
					2.4+	7.55	0
					5.9+	8.18	0
					15+	9.16	0
					1+	10.2	0

C.P. Browne, Bull. Am. Phys. Soc. 1, No. 4, 212 SA13 (1956).

$^{27}_{13}\text{Al}$	Levels	$\text{Al}^{27}(\text{p}, \text{p}'\gamma)$	
13 14		(0.840)	recoil
		(1.010)	$\tau < 70 \mu\text{s}$

C.P. Swann, W.C. Porter, Bull. Am. Phys. Soc. 1, No. 1, 29, GA11 (1956).

†mb/sterad at 0°    \*mb/sterad at 30° peak

J.M. Calvert, A.A. Jaffe, A.E. Litherland, E.E. Maslin, Proc. Phys. Soc. 68A, 1008 (1955).

$\gamma$	$\text{Al}^{27}(\text{n}, \text{n}'\gamma)$	$E_n = 3.7$	scin
	0.835 10	$\sigma(90^\circ) = 22 \text{ mb/sterad}$	
	1.02 1	$\sigma(90^\circ) = 41 \text{ mb/sterad}$	
	1.72 2		
	1.91 2		
	2.22 3		

M.A. Rothman, H.S. Hans, C.E. Mandeville, Phys. Rev. 100, 83 (1955).

Level	$\text{Si}^{(28)}(\text{n}, \text{n}'\gamma)$	$E_n = 0.35 \text{ to } 3.9$
$\gamma$	1.78 2	scin

R.B. Day, A.E. Johnsrud, D.A. Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956); verbal report.

Level	$\text{Si}(\text{n}, \text{n}'\gamma)$	$E_n = 3.7$	scin
$\gamma$	1.78 2	$\sigma(90^\circ) = 60 \text{ mb/sterad}$	

M.A. Rothman, H.S. Hans, C.E. Mandeville, Phys. Rev. 100, 83 (1955).

$^{28}_{13}\text{Al}$	Levels	$\text{Al}^{27}(\text{d}, \text{p})$	$E_d = 6; 5^\circ \text{ to } 60^\circ$
13 15		Level $I_n$	Level $I_n$ s
		g.s.	0
		0.031	0
		1.017	2, 0
		2.143	0
		2.663	2
		3.294	0
			3.347 0
			3.461 1
			3.591 1
			3.669 0
			3.704 0

Weak p groups corresponding to 11 levels below 3.59 approx. isotropic

H.A. Enge, W.W. Buechner, A. Sperduto, M. Mazari, Bull. Am. Phys. Soc. 1, No. 4, 212 SA12 (1956).

$\text{Al}^{27}(\text{d}, \text{p}\gamma)$	time of flight
p(0.032 $\gamma$ ) delay = 1.9 $\mu\text{s}$ 2	

J.C. Severiens, S.S. Hanna, Phys. Rev. 100, 1254A (1955); verbal report.

Level	$\text{Al}^{27}(\text{p}, \gamma)$	$s\pi, \text{p res. calibr.}$
	12.545	$E_p = 0.9908 \text{ 2}$

F. Bumiller, H.H. Staub, Helv. Phys. Acta 28, 355A (1955).

$\gamma$	$\text{Al}^{27}(\text{d}, \gamma\gamma)$	$E_d = 4.6$
	2.8† 6.9 1 $\frac{1}{2}$	0.6† 8.75 4
	2.4† 7.38 6 $\frac{1}{2}$	1.0† 9.08 4
	2.3† 7.55 6 $\frac{1}{2}$	0.7† 9.45 8
	1.9† 7.91 4	0.4† 9.87 8
	0.8† 8.28 4	0.1† 10.7 2

†Average  $\sigma$  in mb for  $E_d = 2.7 \text{ to } 4.6$

May also belong to  $^{25}\text{Mg}$ ,  $^{28}\text{Al}$ ;  $^{28}\text{Al}$

R.D. Bent, T.W. Bonner, J.H. McCrary, W.A. Ranken, Phys. Rev. 100, 774 (1955).

Resonance peak	$\text{Al}^{27}(\text{n}, \text{n})$	$\text{Li}(\text{p}, \text{n})$
	0.090 J = 3	n, n( $\theta$ )
	$I_n = 0 \text{ or } 1 ?$	

R.C. Block, H.W. Newson, Bull. Am. Phys. Soc. 1, No. 1, 55, R3 (1956).

$\text{Si}^{29}_{14}$	Levels	$\text{Si}^{(28)}(\text{d}, \text{p})$	$E_d = 4.44$
14 15		g.s.	s
		Q = 6.229 40	
		1.237	6.453
		2.038	6.728
		2.416	7.000
		3.083	7.577
		3.662	7.820
		4.223?	8.354
		4.931	8.832
		5.944	9.112?
		6.138?	

$^{29}_{13}\text{Al}$	$\gamma(\text{Si}^{29})$	$\text{Si}^{29}(14\text{-Mev n}, \text{p})$	scin
13 16	15† 1.28		
6.6 $\mu$	1† 2.43		
	No 1.15, 2.03 $\gamma$		

D.A. Bromley, H.E. Gove, A.E. Litherland, E.B. Paul, E. Almqvist, Bull. Am. Phys. Soc. 1, No. 1, 30, GA12 (1956).

L.M. Khromchenko, Doklady Akad. Nauk SSSR 98, 761 (1954).

$\text{Si}^{29}_{14\ 15}$	Level $\gamma$	$\text{Si}^{(29)}(n,n'\gamma)$ 1.29	$E_n = 0.35$ to 3.9 scin	$\text{P}^{32}_{15\ 17}$	$\gamma$	$\text{P}^{31}(d, ? \gamma)$ For possible $\gamma$ 's in $\text{P}^{32}$ see $\text{Si}^{29}$ , Bent et al.	$E_d = 4.6$
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R.B.Day, A.E.Johnsrud, D.A.Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956); verbal report.

Level	$\text{Si}^{29}(p,p'\gamma)$	$E_p = 2.5$ to 3.0
$\gamma$	2.03 level $J = 5/2^+$	$p,\gamma(\theta)$
	1† 0.75 99† 2.03	scin
	1† 1.28	
	(0.75 $\gamma$ )(1.28 $\gamma$ )	

D.A.Bromley, H.E.Gove, A.E.Litherland, E.B. Paul, E.Alsqvist, Bull. Am. Phys. Soc. 1, No. 1, 30, GA12 (1956).

$\gamma$	$\text{P}^{31}(d, ? \gamma)$	$E_d = 4.6$
	4.1† 4.41 4 2.5† 6.11 4	sl pr
	5.0† 4.71 4 1.6† 6.84 4	
	5.0† 4.94 4 0.7† 7.46 8	
	3.7† 5.29 4 0.4† 8.16 4	
	3.5† 5.79 4 0.3† 8.53 4	

$\gamma$ 's may also be assigned to  $\text{P}^{32}$  or  $\text{S}^{32}$

†Average  $\sigma$  in mb for  $E_d = 2.6$  to 4.6

R.D.Bent, T.W.Bonner, J.H.McCrory, W.A. Ranken, Phys. Rev. 100, 774 (1955).

Resonance peaks	$\text{Si}^{(28)}(n,n'\gamma)$	$E_n = 0.35$ to 3.9
	1.9	scin 1.78 $\gamma$
	2.08	2.35
	2.27	2.45

R.B.Day, A.E.Johnsrud, D.A.Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956); verbal report.

$\text{Si}^{30}_{14\ 16}$	Level $\gamma$	$\text{Si}^{(30)}(n,n'\gamma)$ 2.19	$E_n = 0.35$ to 3.9 scin
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R.B.Day, A.E.Johnsrud, D.A.Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956).

$\text{P}^{31}_{15\ 16}$	Level	$\text{P}^{31}(p,p')$ 1.264 4'	-sd; 90°
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D.M.Van Patter, C.P.Swann, W.C.Porter, C.E. Mandeville, Bull. Am. Phys. Soc. 1, No. 1, 39 JA1 (1956); verbal report.

Levels	$\text{Si}^{30}(p,\gamma)$	$E_p = 1.7$ to 2.3
	Level	J
	1.26	3/2 <sup>+</sup>
	2.23	$\geq 5/2^+$
$E_o$		
1.73	8.96	3/2 <sup>+</sup>
1.82	9.05	3/2 <sup>+</sup> ?

E.B.Paul, G.A.Bartholomew, H.E.Gove, A.B. Litherland, Bull. Am. Phys. Soc. 1, No. 1, 39, JA2 (1956).

$\text{S}^{32}_{16\ 16}$	Levels	$\text{P}^{31}(d,n)$	$E_d = 9.2$
	1.9† g.s.	$l_p = 0$	ic p recoil
	0.35† 2.25	$l_p = 2$	
	1.3† { (3.81) (4.32) (4.50) (4.74) (5.04)	$l_p = 0$	
	0.46†		
	1.2† 5.83	$l_p = 2$	

†Peak  $\sigma$  in mb/sterad

No 0.5, 1.5 levels

J.M.Calvert, A.A.Jaffe, A.E.Litherland, E.E. Maslin, Proc. Phys. Soc. 68, 1008 (1955).

$\gamma$	$\text{S}^{(32)}(n,n'\gamma)$	$E_n = 3.7$ ; scin
	2.25 3	

M.A.Rothman, H.S.Hans, C.E.Mandeville, Phys. Rev. 100, 83 (1955).

$\gamma$	$\text{P}^{31}(d, ? \gamma)$	$E_d = 4.6$
	For possible $\gamma$ 's in $\text{S}^{32}$ see $\text{Si}^{29}$ , Bent et al.	

$\text{S}^{33}_{16\ 17}$	Levels	$\text{Cl}^{(35)}(d,\alpha)$	$E_d = 3.0$ to 7.5
		g.s. Q = 8.277 10	s
		0.844 6	
		1.966 7	3.840 9
		2.312 8	3.947 9
		2.869 8	4.060 9
		2.938 8	4.105 9
		2.969 8	4.159 9
		3.227 8	4.224 9
		3.365 8	4.749 10

No 4.42 level observed. See also  $\text{S}^{35}$

C.H.Paris, W.W.Buechner, P.M.Endt, Phys. Rev. 100, 1317 (1955).

$\text{S}^{34}_{16\ 18}$	Levels	$\text{Cl}^{(37)}(p,\alpha)$	$E_d = 3.0$ to 7.5
		g.s. Q = 3.015 11	sd; 90°
		2.129 14	

D.M.VanPatter, C.P.Swann, W.C.Porter, C.E. Mandeville, Bull. Am. Phys. Soc. 1, No. 1, 39 JA1 (1956); verbal report.

$\text{S}^{35}_{16\ 19}$	Levels	$\text{Cl}^{(37)}(d,\alpha)$	$E_d = 3.0$ to 7.5
		g.s. Q = 7.783 12	s
		1.992° 10	2.714 10
		2.348° 10	4.025° 10

\*From weak groups. Assignable to  $\text{S}^{33}$  or  $\text{S}^{35}$

C.H.Paris, W.W.Buechner, P.M.Endt, Phys. Rev. 100, 1317 (1955).

$S^{37}$   $\beta^-$  (90%) 1.6  $A^{(40)}(n,\alpha)$ ; scin  
 16 21 (10%) ~4.7  
 5.0<sup>m</sup>  $\gamma(Cl^{37})$   
 100† 3.12  
 No other  $\gamma$  with  $E_\gamma < 2$  (<1†)

H. Morinaga, E. Bleuler, Bull. Am. Phys. Soc.  
 1, No. 1, 30, H2 (1956); verbal report.

$Cl^{33}$  Resonances  $S^{(32)}(d,p)$   $E_p = 1.8$  to  $4.0$   
 17 16  $62^\circ$  to  $167^\circ$ ; scin

$E_0$	$\Gamma(\text{keV})$	$J$
1.900	8.5	$3/2^-$
2.30	52	$1/2^-$
2.575	$\leq 5$	
2.810	$\sim 6$	$3/2^-$
2.902	$\leq 5$	
2.917	$\leq 5$	
3.092	$\leq 4$	$3/2^+, 5/2^+$
3.194	$\leq 4$	
3.265	32	$1/2^+$
3.381	$\leq 4$	$5/2^-, 7/2^-$
$\sim 3.5^*$	300	
3.718	$\leq 4$	

\*Probably double

J. W. Olness, W. Haerberli, H. W. Lewis, Bull. Am. Phys. Soc. 1, No. 4, 212 SA14 (1956); verbal report.

Resonances  $S^{(32)}(d,p')$   $E_p = 2.7$  to  $3.8$   
 2.810 scin 2.2 $\gamma$   
 2.902  
 2.917  
 3.094<sup>\*</sup>  
 3.195<sup>\*</sup>  
 3.379<sup>\*</sup>  
 3.716<sup>\*</sup>  
 \* $p,\gamma(\theta)$  anisotropic,  $\Gamma < 2$  kev

H. W. Lewis, J. W. Olness, W. Haerberli, Bull. Am. Phys. Soc. 1, No. 4, 213 SA15 (1956).

$Cl^{35}$  Levels  $Cl^{(35)}(p,p')$  sd 90°  
 17 18  
 1.219 5  
 1.760 4

D. M. Van Patter, C. P. Swann, W. C. Porter, C. E. Mandeville, Bull. Am. Phys. Soc. 1, No. 1, 39, JA1 (1956); verbal report.

Levels  $Cl^{35}(d,p')$   $E_p = 4.6$  to  $5.6$   
 1.220 5 s77  
 1.766 6  
 No evidence for 0.7 level\*

J. P. Schiffer, C. R. Gossett, G. C. Phillips, T. E. Young, Bull. Am. Phys. Soc. 1, No. 2, 95, N2 (1956); \*verbal report.

$Cl^{36}$   $\beta^-$  98.3% (0.714)  $CH_3Cl$  in pc  
 17 19  $\epsilon_K$  1.7% (K x ray +  $e_{AK}$ )/ $\beta = 0.017$  f  
 3.1x10<sup>5y</sup> No  $\gamma$  (<10<sup>-2</sup>%) scin, pc ce

R. W. P. Drever, A. Moljk, Phil. Mag. 46, 1337 (1955).

$Cl^{36}$  Levels  $Cl^{(35)}(d,p)$   $E_d = 3.0$  to  $7.5$   
 17 19 g.s. Q = 6.354 s s

0.790 5	3.110 s
1.163 6	3.214 s
1.600 7	3.341 s
2.473 7	3.474 s
2.498 7	3.606 s
2.523 7	3.644 s
2.684 7	3.673 s $Cl^{38}?$
2.820 7	3.732 s
2.872 7	3.970 s
2.905 7	4.003 s
3.004 7	4.043 s

C. H. Paris, W. W. Buechner, P. M. Endt, Phys. Rev. 100, 1317 (1955).

Resonances  $Cl^{(35)}(n)$   $E_n = 0.03$  to  $15000$  ev  
 -140 ev  $\Gamma_n = 0.72^*$  ev  $\Gamma_\gamma = 0.48^*$   
 405 6  $\Gamma_n = 0.14^*$

8700 cryst, chopper  
 \*Assuming  $J = 2$  <sup>§</sup>From  $\Gamma < 0.6$  and  $\sigma_0 > 580$

R. M. Brugger, J. E. Evans, E. G. Joki, R. S. Shankland, Bull. Am. Phys. Soc. 1, No. 4, 176 F11 (1956); verbal report.

$Cl^{37}$  Level  $Cl^{(37)}(d,p')$   $E_p = 4.6$  to  $5.6$   
 17 20 1.713 10 s77

J. P. Schiffer, C. R. Gossett, G. C. Phillips, T. E. Young, Bull. Am. Phys. Soc. 1, No. 2, 95, N2 (1956).

$Cl^{38}$  Levels  $Cl^{(37)}(d,p)$   $E_d = 3.0$  to  $7.5$   
 17 21 43† g.s. Q = 3.877 s s  
 100† 0.672 5 1.620 7  
 0.762 5 1.658 7  
 1.312 6 1.693 7

†Relative intensity for  $E_d = 5.6$ , compatible with  $J = 2^-, 5^-$  for g.s., 0.672 levels resp.

C. H. Paris, W. W. Buechner, P. M. Endt, Phys. Rev. 100, 1317 (1955).

$A^{35}$   $Cl^{(35)}(10\text{-Mev } p,n)$  chem  
 18 17  $\tau$  1.83<sup>s</sup> 2  
 1.8  $\beta^+$  ~93% 4.96 4 sl  
 $\gamma(Cl^{35})$   
 $\leq 3\%$  1.19 4 scin  
 $\leq 3\%$  1.73 4

O. C. Kistner, A. Schwarzschild, B. M. Rustad, Bull. Am. Phys. Soc. 1, No. 1, 30, H3 (1956).



- $A^{37}$   
18 19  
34<sup>d</sup>  
 $E_{\epsilon}$  0.812  $\delta$  s  $Cl^{37}$  recoil  
 $e_{AK}$  65%  
Charges 1 to 6 ( $av.=2.6$ ) found on recoils  
Charge distribution and  $\epsilon_L/\epsilon_K$  value are  
discussed elsewhere  
O. Kofoed-Hansen, A. Nielsen, Kgl. Danske  
Videnskab. Selskab Mat-fys. Medd. 29, No. 15  
(1955); Phys. Rev. 96, 1045 (1954). \*A.  
Winther, J. phys. radium 16, 562 (1955); R. A.  
Rubenstein, J. N. Snyder, Phys. Rev. 99, 189  
(1955); P. Benoist-Gueutal, Ann. Phys. 8, 593  
(1953).
- $E_{\epsilon}$  0.814 2 s  $Cl^{37}$  recoil  
Charges 1 to 7 ( $av.=3.2$ ) found on recoils  
A. H. Snell, F. Pleasonton, Phys. Rev. 100,  
1396; 98, 1174A; 97, 246 (1955).
- $\epsilon$  scin  $\gamma$  continuum  
High intensity of photons,  $E_{\gamma} < 0.030$ ,  
supports theory of Glauber and Martin\*  
T. Lindqvist, C. S. Wu, Phys. Rev. 100, 145;  
98, 231A (1955); \*R. J. Glauber, P. C. Martin,  
Phys. Rev. 95, 572 (1954).
- $A^{41}$   
18 23  
1.8<sup>h</sup>  
 $\tau$  1.8<sup>h</sup>  $A^{(40)}$  (pile n,  $\gamma$ )  
 $\beta^-$  99.1% 1.199  $\delta$  F-K linear ( $E_{\beta} > 0.15$ )  
0.88% 2.48 4  $\Delta J = 2$ , yes shape sl, s  $\pi$   
 $\gamma(K^{41})$  1.290 5 scin  
A. Schwarzschild, B. M. Rustad, C. S. Wu, Bull.  
Am. Phys. Soc. 1, No. 1, 30, H4 (1956).
- $K^{40}$   
19 21  
1.3x10<sup>9y</sup>  
 $\epsilon/\text{sec gm K} = 3.1 \pm 0.15$  from  $K^{40}/A^{40}$  in  
micas of known age (Pb/U). Result insens-  
itive to assumed value,  $\beta'$ 's/sec gm K = 27.6  
L. T. Aldrich, G. W. Wetherill, G. L. Davis, G. R.  
Tilton, Bull. Am. Phys. Soc. 1, No. 1, 31,  
H5 (1956); verbal report.  
3.50  $\pm$  0.14  $\gamma$ 's/sec gm K scin  
Absolute count ( $Pr^{142}$ ,  $Co^{60}$ ,  $Fe^{59}$  standards)  
G. Backenstoss, K. Goebel, Z. Naturf. 10a, 920  
(1955).
- $Ca^{47}$   
20 27  
4.8<sup>d</sup>  
 $\tau$  4.5<sup>d</sup>  $Ca^{(48)}$  (14-Mev p, pn)  
 $\beta^-$  76% 0.70 2  $Ca^{46}$  (pile n,  $\gamma$ ) chem  
24% 1.93 20 a  $\beta\gamma$   
 $\gamma(Sc^{47})$  5% 0.500 4 $\pi$  pc, scin  
5% 0.812  
71% 1.29  
(0.70  $\beta$ )(0.50, 0.81, 1.29  $\gamma$ )  
(0.50  $\gamma$ )(0.81  $\gamma$ ) No (1.9  $\beta$ ) $\gamma$  No  $\gamma$ (1.29  $\gamma$ )  
W. S. Lyon, T. H. Handley, Phys. Rev. 100, 1280  
(1955).
- $Ca^{48}$   
20 28  
 $\tau_{\beta\beta}$   $> 2 \times 10^{18}y$  38%  $Ca^{48}$ ; 4 $\pi$  scin  
 $> 1.1 \times 10^{18}y$   $\beta\beta$   
Search covered  $2.5 < E_{\beta} < 4.25$  and  $3.0 < E_{\beta} < 4.5$   
Long  $\tau$  suggests  $\nu$  and anti- $\nu$  are nonidentical  
M. Avaschalom, Bull. Am. Phys. Soc. 1, No. 1,  
31, H7 (1956); verbal report.
- $Ca^{49}$   
20 29  
8.5<sup>m</sup>  
 $\tau$  8.9<sup>m</sup> 2  $Ca^{48}$  (pile n,  $\gamma$ )  
 $\beta^-$   $\sim 1.0$  a  $\beta\gamma$   
2.12 10 No 5.2  $\beta$  ( $\leq 1\%$ ) a  
 $\gamma(Sc^{49})$  89% 3.07 5 scin  
10% 4.04 6  
0.80%  $\sim 4.7$  No  $\sim 1.0 \gamma$   
(2.1  $\beta$ )(3.07  $\gamma$ ) ( $\sim 1.0 \beta$ )(4.04  $\gamma$ )  
No (3.07  $\gamma$ )  $\gamma$  ( $< 3\%$  of 3.07  $\gamma$ )  
D. W. Martin, S. B. Burson, J. M. Cork, Phys. Rev.  
100, 1236A (1955); verbal report.
- $Sc^{42}$   
21 21  
0.6<sup>s</sup>  
 $\tau$  0.62<sup>s</sup> 5  $K^{(39)}$  (18-Mev  $\alpha$ , n)  
 $\beta^+$  Several Mev scin  
Yield too large for  $Ti^{43}$  production from Ca  
impurity.  $\tau$  fits systematics for  $0^+ \rightarrow 0^+$   
H. Morinaga, Phys. Rev. 100, 431 (1955).
- $Sc^{44}$   
21 23  
4.0<sup>h</sup>  
g.s.  
 $\beta^+$  93.2 $\dagger$  1.471 5  $K^{(41)}$  (19-Mev  $\alpha$ , n) chem  
F-K linear ( $E_{\beta} > 0.200$ ) sl  $\beta\gamma/\gamma$   
 $\gamma(Ca^{44})$  100 $\dagger$  1.159 3  $\alpha = 6.3 \times 10^{-5}$  sl ce  
0.12 $\dagger$  2.54 3  
(1.47  $\beta$ )(1.16  $\gamma$ ) sl, scin  
No 1.38  $\gamma$  ( $\leq 0.5\%$ )  
Intensity of e's with  $E < 0.15$  compatible  
with value expected for atomic excitation  
J. W. Blue, E. Bleuler, Phys. Rev. 100, 1324;  
99, 659A (1955).
- $Sc^{44}$   
21 23  
2.4<sup>d</sup>  
 $\gamma$  (0.271)  $\alpha = 0.139$  3 sl ce, scin  
J. W. Blue, E. Bleuler, Phys. Rev. 100, 1324;  
99, 659A (1955).
- $Sc^{45}$   
21 24  
Levels  $Sc^{45}$  (n, n' $\gamma$ )  $E_n = 0.35$  to 3.9  
 $\gamma$  0.36 0.97 scin  
0.53 1.23  
0.72 1.41  
R. B. Day, A. E. Johnsrud, D. A. Lind, Bull. Am.  
Phys. Soc. 1, No. 1, 56, R9 (1956).
- $Sc^{47}$   
21 26  
3.43<sup>d</sup>  
 $\beta^-$  64% 0.430 5  $Ti^{(48)}$  ( $\gamma$ , p) chem  
36% 0.596 10 sl  $\beta\gamma$   
 $\gamma$  0.167 2 sl  
(0.430  $\beta$ ) $\gamma$  No ce scin  
R. T. Nichols, E. N. Jensen, Phys. Rev. 100,  
1407 (1955).

Sc <sup>50</sup> 21 29 1.7 <sup>m</sup>	$\tau$ 1.74 <sup>m</sup> 4 $\beta^-$ ~1† ~3.5 $\gamma(\text{Ti}^{50})$ ~1† 1.17 1† 1.59 (1.17 $\gamma$ )(1.59 $\gamma$ )  H.Morinaga, E.Bleuler, Phys. Rev. 100, 1236A (1955); verbal report.	Ti <sup>50</sup> (fast n,p) scin scin $\Sigma$ scin	V <sup>52</sup> 23 29	Capture $\gamma$ 's V <sup>(51)</sup> (th n, $\gamma$ ) 0.43 2 scin Cp 0.64 2 ~0.82 double? Study covered E $_{\gamma}$ = 0.1 to 2.5  M.Reier, M.H.Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).
Ti 22	Capture $\gamma$ 's Ti(th n, $\gamma$ ) 0.334 6 scin Cp 1.39 2 1.75 4 Also unresolved $\gamma$ 's with 1.06 < E $_{\gamma}$ < 1.10 and 1.53 < E $_{\gamma}$ < 1.58 Study covered E $_{\gamma}$ = 0.1 to 2.5  M.Reier, M.H.Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).		Cr 24	Levels Cr(n,n') E $_n$ = 4.3; scin 1.4 pulsed n's, 90° 2.5 2.9 3.1 ?  R.V.Smith, Bull. Am. Phys. Soc. 1, No. 4, 175 F2 (1956); verbal report.
Ti <sup>45</sup> 22 23	Levels Sc <sup>45</sup> (p,n) E $_p$ = 2.9 to 5.5; VdG Level thresh n, ~0° g.s. Q = -2.844 4 0.743 11 1.194 8 1.347 10 1.460 11 1.876 10 2.016 13 2.430 11 2.555 8 Graph of $\sigma(\sim 0^\circ)$ given for n yield  R.M.Brugger, T.W.Bonner, J.B.Marion, Phys. Rev. 100, 84 (1955).			Capture $\gamma$ 's Cr(th n, $\gamma$ ) 0.740 20 1.07 6 scin Cp 0.815 16 2.13 5 Study covered E $_{\gamma}$ = 0.1 to 2.5  M.Reier, M.H.Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).
V <sup>50</sup> 23 27	Level V <sup>50</sup> ( $\alpha$ , $\alpha'$ ) E $_{\alpha}$ = 4.4 $\gamma$ 0.226 $\epsilon$ B(E2) = 0.011 scin  L.W.Fagg, E.H.Geer, E.A.Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.  Level V <sup>50</sup> ( $\alpha$ , $\alpha'$ ) E $_{\alpha}$ = 6.5 $\gamma$ 0.225 $\epsilon$ B(E2) = 0.011 scin  N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.		Cr <sup>48</sup> 24 24 24 <sup>h</sup>	$\tau$ 23 <sup>h</sup> 1 Ni(380-Mev p) chem $\gamma(\text{V}^{48})$ 95† 0.116 2 $\alpha$ = 0.02 M1 scin, 100† 0.305 10 $\alpha$ = 0.006 E2 sl ce No $\beta^+$ (< 2† from $\gamma^{\pm}$ < 1†) scin No 0.420 $\gamma$ (< 2†) No other $\gamma$ (0.116 $\gamma$ )(0.305 $\gamma$ ) p 16 <sup>d</sup> V <sup>48</sup>  R.van Lieshout, D.H.Greenberg, L.A.Ch.Koerts, C.S.Wu, Phys. Rev. 100, 223; 98, 1171 (1955).
V <sup>51</sup> 23 28	Level V <sup>(51)</sup> ( $\gamma$ , $\gamma$ ) Cr <sup>51</sup> recoil (0.320) $\tau$ = 100 $\mu$ s 20 $\sigma$  H.Schopper, Z.Phys. 114, 476 (1956).  Levels V <sup>(51)</sup> (p, p') E $_p$ = 6.005, 7.420 0.322 2 s 90°, 130° 0.931 3 1.614 5 1.819 5 No evidence for levels at 0.48, 1.16  W.W.Buechner, C.M.Braams, A.Sperduto, Phys. Rev. 100, 1387 (1955).		Cr <sup>51</sup> 24 27 27 <sup>d</sup>	Cr <sup>(50)</sup> (pile n, $\gamma$ ) chem E $_{\epsilon}$ (92.2%) 0.756 5 $\gamma$ continuum $\gamma(\text{V}^{51})$ 7% (0.320) (0.320 $\gamma$ )/( $\gamma$ continuum) scin 9.8% (0.320) (0.320 $\gamma$ )/(K x ray) 0.026% 0.624 5  S.G.Cohen, S.Ofer, Phys. Rev. 100, 856 (1955).  Cr <sup>(50)</sup> (pile n, $\gamma$ ) chem E $_{\epsilon}$ (92.2%) 0.756 5 $\gamma$ continuum $\gamma(\text{V}^{51})$ 7% (0.320) (0.320 $\gamma$ )/( $\gamma$ continuum) scin 9.8% (0.320) (0.320 $\gamma$ )/(K x ray) 0.026% 0.624 5  A.Bisi, E.Germagnoli, L.Zappa, Nuovo. cim. 2, 1052 (1955).
				$\gamma(\text{V}^{51})$ (0.320) $\alpha$ = 0.0031 2 E2 GM  I.V.Estulin, E.M.Moiseeva, Soviet Phys. JETP 1, 463 (1955); Zhur. Eksptl' i Teoret. Fiz. 28, 541 (1955).

Cr <sup>52</sup> 24 28	Levels	Cr <sup>(52)</sup> (n,n')	E <sub>n</sub> = 4.4 ppl p-recoil
	37†	g.s.	
	14†	(1.43)	
	~5†	(2.43)	
	~14†	(3.13)	
	†σ(90°) in mb/sterad		

J.B. Weddell, B. Jennings, Bull. Am. Phys. Soc. 1, No. 1, 55, R5 (1956); verbal report.

Resonance peaks	V <sup>51</sup> (p,n) E <sub>o</sub> <sup>§</sup>	E <sub>p</sub> = 1.55 to 1.68 E <sub>o</sub> <sup>§</sup>
	1.568*	1.629*
	1.573*	1.637*
	1.575	1.651
	1.592**	1.658*
	1.598**	1.669*
	1.603*	1.672
	1.607*	
	1.617*	Threshold = 1.5656 15
	*p,n(θ) isotropic      **p,n(θ) anisotropic	
	§E <sub>p</sub> values for isolated resonances	

J.H. Gibbons, R.L. Macklin, H.W. Schmitt, Phys. Rev. 100, 167 (1955).

Cr <sup>53</sup> 24 29	Resonance peaks	Cr <sup>(52)</sup> (n,n)	Li(p,n); n,n(θ)
	0.058	J = 1/2 <sup>+</sup>	I <sub>n</sub> = 0
	0.100	= 1/2 <sup>+</sup>	= 0

R.C. Block, H.W. Newson, Bull. Am. Phys. Soc. 1, No. 1, 55, R3 (1956).

Mn <sup>54</sup> 25 29 291 <sup>d</sup> g.s.	E <sub>ε</sub>	0.528 20	x(continuum γ)
	R.G. Jung, M.L. Pool, Bull. Am. Phys. Soc. 1, No. 4, 172 E11 (1956).		

Mn <sup>55</sup> 25 30	Level	Mn <sup>55</sup> (α, α'γ)	E <sub>α</sub> = 3
		0.128 level J = 7/2 <sup>-</sup>	p, γ(θ)
	γ	(0.128) α <sub>K</sub> = 0.0144 30°	s ce
		M1 (≥ 98%)	
		*From (α <sub>K</sub> 0.137 γ Ta <sup>181</sup> )/(α <sub>K</sub> 0.128 γ Mn <sup>55</sup> ) = 125 25	

E.M. Bernstein, H.W. Lewis, Phys. Rev. 100, 1367 (1955).

Mn <sup>56</sup> 25 31 2.6 <sup>h</sup>	γ(Fe <sup>56</sup> )	0.845 6 1.809 9 2.134 11	Mn <sup>55</sup> (th n, γ); scin
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M.G. Muñoz, D. Maeder, Helv. Phys. Acta 28, 359A (1955).

Mn <sup>56</sup> 25 31	Capture γ's	Mn <sup>55</sup> (th n, γ)	scin Cp
		0.098 5	0.266 15
		0.206 10	0.308 15
	Study covered E <sub>γ</sub> = 0.1 to 2.5		

M. Reier, M.H. Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).

Mn <sup>56</sup> 25 31	Resonances σ(peak)	Mn <sup>55</sup> (n) E <sub>o</sub> (kev)	E <sub>n</sub> = 0.175 to 10 kev Γ (ev)	J chopper
	2830	0.337 3	21.5	2
		1.08 2	14.4	3
	702	2.36 6	340	3
		7.50		

Γ<sub>γ</sub> assumed to be 0.6 ev

L.M. Bollinger, D.A. Dahlberg, R.R. Palmer, G.E. Thomas, Phys. Rev. 100, 128 (1955); 95, 645A (1954).

Fe 26	Levels	Fe(n,n')	E <sub>n</sub> = 4.3; scin pulsed n's
		g.s.	
		0.8	
		2.2	
		3.1	

R.V. Smith, Bull. Am. Phys. Soc. 1, No. 1, 55, R6 (1956); verbal report.

Capture γ's	Fe(th n, γ)	scin Cp
	0.353 8	
Also unresolved γ's with 1.55 < E <sub>γ</sub> < 1.68		
Study covered E <sub>γ</sub> = 0.1 to 2.5		

M. Reier, M.H. Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).

Fe <sup>54</sup> 26 28	Levels	Fe <sup>(54)</sup> (p, p')	E <sub>p</sub> = 7.04 sd; 30°, 130°
		1.41	
		2.54	3.16
		2.57	3.34

W.W. Buechner, A. Sperduto, Bull. Am. Phys. Soc. 1, No. 1, 39, J43 (1956).

Fe <sup>55</sup> 26 29	Levels	Fe <sup>54</sup> (d, p)	E <sub>d</sub> = 6.54, 7.01 Q = 7.073 s; 10°, 45°
		g.s.	
		0.413	
		0.932	
		1.413	

Many levels observed between 1.93 and 4

A. Sperduto, W.W. Buechner, Bull. Am. Phys. Soc. 1, No. 4, 223 W4, 311 (1956).

Levels	Mn <sup>55</sup> (p, n)	E <sub>p</sub> = 1.7 to 3.9 thresh n, ~0°
	0.925 5	
	1.327 9	
	2.165 15	

R.A. Chapman, J.B. Marion, J.C. Slattery, Bull. Am. Phys. Soc. 1, No. 2, 95, N3 (1956); verbal report.

Fe <sup>56</sup> 26 30	Levels	Fe <sup>(56)</sup> (n, n')	E <sub>n</sub> = 6.5 ppl p-recoil
	13†	g.s.	
	6†	0.85	
	3†	2.09	
	†σ(90°) in mb/sterad		

J.B. Weddell, B. Jennings, Bull. Am. Phys. Soc. 1, No. 1, 55, R5 (1956); verbal report.



$^{56}\text{Fe}$ 26 30	Level	$\text{Fe}^{(56)}(n,n'\gamma)$ (0.850)	$E_n = 2.45$ pulsed n's	$\text{Co}^{56}$ 27 29	ground state	
	$\sigma(\theta)$ not symmetric about $90^\circ$			J	4	para
	$\sigma(90^\circ) = 85.3$ mb/sterad			$ \mu $	3.835 7	
					From $\mu(\text{Co}^{59})/\mu(\text{Co}^{56}) = 1.205$	

L.Cranberg, J.S.Levin, Bull. Am. Phys. Soc. 1, No. 1, 58 R10 (1956); verbal report; Phys. Rev. 100, 434 (1955).

R.V.Jones, W.Dobrowolski, C.D.Jeffries, Phys. Rev. 102, 738 (1956).

Levels	$\text{Fe}^{(56)}(d,p')$	$E_p = 7.04$
0.85		sd; $30^\circ, 130^\circ$
2.08	3.12	
2.66	3.37	
2.94	3.45	
2.96	3.60	

W.W.Buechner, A.Sperduto, Bull. Am. Phys. Soc. 1, No. 1, 39, JA3 (1956); verbal report.

$\gamma$	$\text{Fe}^{(56)}(n,n'\gamma)$	$E_n = 3.7$ ; scin
0.845 10	$\sigma(90^\circ) = 135$ mb/sterad	
1.23 1		
1.80 2	$\sigma(90^\circ) = 24$ mb/sterad	
2.10 3		

M.A.Rothman, H.S.Hans, C.E.Mandeville, Phys. Rev. 100, 83 (1955).

ground state	
$ \mu $	2.6 2 from $ g  = 0.66$ 4 $\gamma(\theta, T)$

R.C.Sapp, Bull. Am. Phys. Soc. 1, No. 2, 91, L1 (1956).

$\text{Co}^{56}$ 27 29 77 <sup>d</sup>	$\beta^+$ $\gamma(\text{Fe}^{56})$	1.47 3		sl scin
	100 <sup>†</sup>	0.845	15 <sup>†</sup>	2.02
	10 <sup>†</sup>	1.03 ?	20 <sup>†</sup>	2.6
	65 <sup>†</sup>	1.24	2 <sup>†</sup>	2.99
	20 <sup>†</sup>	1.75	15 <sup>†</sup>	3.25
	No 0.440, 0.977 $\beta$ (<2% of 1.47 $\beta$ )			

J.D.Kurbatov, H.J.Sathoff, Jr., K.Hisatake, M.Sakai, Bull. Am. Phys. Soc. 1, No. 4, 162 B5 (1956); verbal report.

$^{57}\text{Fe}$ 26 31	Levels	$\text{Fe}^{56}(d,p)$	$E_d = 6.54, 7.01$
		g.s. Q = 5.418	s; $10^\circ, 45^\circ$
	0.015		
	0.135		
	0.365		

Many levels observed between 0.36 and 6.5

A.Sperduto, W.W.Buechner, Bull. Am. Phys. Soc. 1, No. 4, 223 W4 (1956).

$\gamma(\text{Fe}^{56})$		$\text{Fe}^{(56)}(p,n)$	
100 <sup>†</sup>	0.85		scin
76 <sup>†</sup>	1.20	19.8 <sup>†</sup>	2.55
18 <sup>†</sup>	1.71	1.6 <sup>†</sup> ~ 3.0	
13 <sup>†</sup>	2.00	14 <sup>†</sup>	3.25
(0.85 $\gamma$ )/ $\beta^+ = 3.8$			

C.S.Cook, F.M.Tomnovec, Bull. Am. Phys. Soc. 1, No. 1, 31, H8 (1956); verbal report

$^{57}\text{Fe}$ 26 31	Level	$\text{Fe}^{(57)}(d,p')$	$E_p = 7.04$
	0.36		sd; $30^\circ, 130^\circ$

W.W.Buechner, A.Sperduto, Bull. Am. Phys. Soc. 1, No. 1, 39, JA3 (1956); verbal report.

$\text{Co}^{57}$ 27 30 270 <sup>d</sup>	$E_\epsilon$	0.434 30	$x(\text{continuum } \gamma)$

R.G.Jung, M.L.Pool, Bull. Am. Phys. Soc. 1, No. 4, 172 E11 (1956).

$^{58}\text{Fe}$ 26 32	Levels	$\text{Fe}^{57}(d,p)$	$E_d = 6.54, 7.01$
		g.s. Q = 7.808	s; $10^\circ, 45^\circ$
	0.799		
	1.664		
	2.125		

Many levels observed between 2.04 and 8.30

A.Sperduto, W.W.Buechner, Bull. Am. Phys. Soc. 1, No. 4, 223 W4; No. 6, 311 (1956).

No  $\beta^+$  (<0.1%) d  $^{36}\text{Ni}$ ; scin  
(0.123  $\gamma$ )(0.014  $\gamma$ ) delay = 101  $\mu\text{s}$  5

W.C.Middelkoop, A.Heyligers, L.H.Th.Rietjens, H.J.Van den Bold, P.M.Endt, Physica 21, 897 (1955).

$^{59}\text{Fe}$ 26 33	Levels	$\text{Fe}^{58}(d,p)$	$E_d = 6.54, 7.01$
		g.s. Q = 4.350	s; $10^\circ, 45^\circ$
	0.286		
	0.473		
	0.728		

Many levels observed between 0.73 and 6.20

A.Sperduto, W.W.Buechner, Bull. Am. Phys. Soc. 1, No. 4, 223 W4 (1956).

$\gamma(\text{Fe}^{57})$		$\text{Fe}^{(56)}(d,n)$ chem	
1 <sup>*</sup>	0.01437 1	K/L	L/M sd ce
49.6 <sup>*</sup>	0.12194 3	8.93	9.1
	0.13631 3	6.7	
		8.2	

\*Relative  $c_{e_K}$  intensity

J.Bellicard, A.Moussa, Compt. rend. 241, 1202 (1955).

Co <sup>58</sup> 27 31 72 <sup>d</sup> g.s.	$\gamma(\text{Fe}^{58})$ 1.6† (0.81) E2/M1=4.8 100† (0.81) E2=100% 0.5† 1.62 (0.81) $\gamma$ (0.81) $\gamma$ ( $\theta$ ) J=2, 2, 0	scin $\gamma\gamma(\theta)$	Ni 28	Levels	Ni(n,n') 1.4 2.1 2.5 2.9	E <sub>n</sub> =4.3; scin pulsed n's, 90°
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A. Rossi, H. Frauenfelder, N. Levine, S. Singer, Bull. Am. Phys. Soc. 1, No. 4, 163 B6 (1956).

R. V. Smith, Bull. Am. Phys. Soc. 1, No. 4, 175 F2 (1956); verbal report.

$\gamma(\text{Fe}^{58})$ 100† (0.81) 0.5† 1.64 4	Ni <sup>(58)</sup> (pile n,p) chem scin	Ni <sup>58</sup> 28 30	Levels	Ni <sup>(58)</sup> (p,p') 1.153° 10 1.453 5	E <sub>p</sub> =4.580, 5.283 2.275° 10 877 2.776° 10
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\*Assignment uncertain; calculation of energy based on A=58

B. L. Robinson, R. W. Pink, Bull. Am. Phys. Soc. 1, No. 1, 40, JA7 (1956); verbal report.

R. R. Spencer, G. C. Phillips, J. P. Schiffer, T. E. Young, Bull. Am. Phys. Soc. 1, No. 2, 95, M13 (1956); verbal report.

Co <sup>59</sup> 27 32	Levels 1.2 1.8 3.1	Co <sup>59</sup> (n,n') E <sub>n</sub> =4.3; scin pulsed n's, 90°	Level $\gamma$	Ni <sup>(58)</sup> (p,p' $\gamma$ ) (1.45) $\tau < 0.2 \mu\text{s}$	E <sub>p</sub> =2.5 to 4.5 scin
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R. V. Smith, Bull. Am. Phys. Soc. 1, No. 4, 175 F2 (1956); verbal report.

M. S. Moore, J. P. Schiffer, C. M. Class, Bull. Am. Phys. Soc. 1, No. 1, 39, JA4 (1956); verbal report.

Co <sup>60</sup> 27 33	<u>ground state</u> $\mu$ positive From circular polarization of $\gamma$ 's from polarized Co <sup>60</sup>	$\gamma$	Ni <sup>58</sup> (n,n' $\gamma$ ) 33† 1.01 1 100† 1.46 2	E <sub>n</sub> =4.4 scin
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J. C. Wheatley, W. J. Huiskamp, A. N. Diddens, M. J. Steenland, H. A. Tolhoek, Physica 21, 841 (1955).

R. M. Sinclair, Bull. Am. Phys. Soc. 1, No. 1, 42, K3 (1956); verbal report.

Co <sup>60</sup> 27 33 5.2 <sup>y</sup>	$\gamma(\text{Ni}^{60})$ 0.0012% 2.158	Co <sup>59</sup> (pile n, $\gamma$ ) chem sd pe	Ni <sup>59</sup> 28 31	Levels	Co <sup>59</sup> (p,n) 0.343 1.22 1.343 1.79 1.96	2.15 thresh n 2.55 2.66
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J. L. Wolfson, Can. J. Phys. 33, 886 (1955).

J. W. Butler, C. R. Gossett, H. D. Holmgren, Bull. Am. Phys. Soc. 1, No. 4, 163 B8 (1956); verbal report.

Co <sup>60</sup> 27 33	Capture $\gamma$ 's 0.237 5 0.289 10 0.43? 1.48 4 0.65 2 1.82 4	Co <sup>59</sup> (th n, $\gamma$ ) scin Cp	Ni <sup>60</sup> 28 32	Levels	Ni <sup>(60)</sup> (p,p') 1.330 5 2.156 10	E <sub>p</sub> =4.580, 5.283 877
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Study covered E <sub>$\gamma$</sub> =0.1 to 2.5

M. Reier, M. H. Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).

R. R. Spencer, G. C. Phillips, J. P. Schiffer, T. E. Young, Bull. Am. Phys. Soc. 1, No. 2, 95, M13 (1956); verbal report.

Co <sup>61</sup> 27 34 1.7 <sup>h</sup>	$\tau$ 1.7 <sup>h</sup> 15 $\gamma(\text{Ni}^{61})$ 0.072 3 $\gamma/\beta \sim 1$ No 0.50 $\gamma$ (<5%) No other $\gamma$	Cu <sup>(65)</sup> (31.5-Mev $\gamma$ , $\alpha$ ) chem scin	Level $\gamma$	Ni <sup>60</sup> ( $\gamma$ , $\gamma$ ) (1.33) $\tau = 0.52 \mu\text{s}$	Co <sup>60</sup> Cl <sub>2</sub> at 1150°C J=2 $\gamma\gamma(\theta)$
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Studied decrease of resonance fluorescence with increasing thickness of Ni absorber placed between source and Ni scatterer

P. Erdős, P. Jordan, D. Wæpder, P. Stoll, Helv. Phys. Acta 28, 323A (1955).

P. R. Metzger, Bull. Am. Phys. Soc. 1, No. 1, 40, JA6 (1956); verbal report.

$\text{Ni}^{60}$   
28 32 Resonances  $\text{Co}^{59}(\text{p}, \gamma)$   $E_p = 1.0$  to  $1.9$   
150 resonances observed for  $E_\gamma \geq 4$   
g.s.  $\gamma$  not observed ( $< 5\%$  of  $\gamma$  to 1.33 level)

C.R.Gossett, J.W.Butler, H.D.Holmgren, Bull.  
Am. Phys. Soc. 1, No. 4, 223 W5 (1956);  
verbal report.

$\text{Ni}^{61}$   
28 33 Levels  $\text{Ni}^{61}(\alpha, \alpha' \gamma)$   $E_\alpha = 4.4$   
 $\gamma$  0.066  $\epsilon \text{B}(\text{E}2) = 0.00038$  scin  
0.282  $= 0.00090$   
0.657  $= 0.0090$

L.W.Fagg, E.H.Geer, E.A.Wolicki, Bull. Am.  
Phys. Soc. 1, No. 4, 165 C4 (1956); verbal  
report.

$\text{Cu}$   
29 Capture  $\gamma$ 's  $\text{Cu}(\text{th n}, \gamma)$   
0.202 10 scin Cp  
0.280 10  
Study covered  $E_\gamma = 0.1$  to  $2.5$

M.Reier, M.H.Shamos, Phys. Rev. 100, 1302  
(1955); 95, 636A (1954).

$\text{Cu}^{59}$   
29 30  $\tau$   $81^S$  1  $\text{Ni}^{(58)}(4\text{-Mev d}, \text{n})$   
 $\beta^+$  100† 3.70 10 s  
 $\gamma(\text{Ni}^{59})$  10† 1.28 2 scin  
~3† 0.33 2 1.8† 1.67 4  
11† 0.865 15 ~0.3† 2.07 5  
 $\gamma^\pm(0.33, 0.865, 1.28 \gamma)$   
No (0.865  $\gamma$ )(1.28  $\gamma$ )

F.W.Prosser, Jr., M.S.Moore, J.P.Schiffer,  
Bull. Am. Phys. 1, No. 4, 163 B7; verbal  
report; No. 1, 39 JA4 (1956).

$\text{Ni}^{58}(5.5\text{-Mev d}, \text{n})$   
 $\beta^+ \geq 95\%$  GM  
 $\epsilon \leq 5\%$  pc (K x ray)/ $\beta^+ \sim 0.015$   
No  $\gamma$  with  $0.08 < E_\gamma < 0.50$  ( $< 0.5\%$  of  $\beta^+$ ) scin

T.Yuasa, G.A.Renard, J. phys. radium, 16,  
889 (1955).

$\gamma(\text{Ni}^{59})$  0.19 ?  $\text{Ni}^{58}(1.84\text{-Mev p}, \gamma)$   
0.35 1.31 scin  
0.87 1.80

J.W.Butler, C.R.Gossett, H.D.Holmgren, Bull.  
Am. Phys. Soc. 1, No. 4, 163 B8 (1956).

$\text{Cu}^{59}$   
29 30 Resonance  $\text{Ni}^{58}(\text{p}, \gamma)$   $E_p = 0.6$  to  $1.8$   
peaks 0.855 scin,  $\text{Cu}^{59} \gamma^\pm$   
0.947  
1.009 1.375  
1.099 1.423  
1.226 1.521  
1.307 1.539  
1.315 1.581

C.R.Gossett, J.W.Butler, H.D.Holmgren, Bull.  
Am. Phys. Soc. 1, No. 1, 40, JA5 (1956).

$\text{Cu}^{61}$   
29 32 Resonance  $\text{Ni}^{60}(\text{p}, \gamma)$   $E_p = 0.6$  to  $1.8$   
peaks 0.725 1.247 1.431 scin  
0.895 1.313 1.451  
1.029 1.319 1.461  
1.066 1.323 1.465  
1.078 1.331 1.483 1.567  
1.132 1.343 1.491 1.578  
1.167 1.347 1.515 1.589  
1.197 1.371 1.519 1.600  
1.209 1.381 1.529 1.607  
1.239 1.415 1.539 1.620  
 $\Gamma < 1\text{kev}$  for all peaks

C.R.Gossett, J.W.Butler, H.D.Holmgren, Bull.  
Am. Phys. Soc. 1, No. 1, 40, JA5 (1956).

$\text{Cu}^{63}$   
29 34 Levels  $\text{Cu}^{63}(\text{n}, \text{n}' \gamma)$   $E_n = 4.4$   
 $\gamma$  4† 0.65 1 6† 1.34 3 scin  
10† 0.97 1 2† 1.43 5  
R.M.Sinclair, Bull. Am. Phys. Soc. 1, No. 1,  
42, K3 (1956); verbal report.

$\text{Cu}^{65}$   
29 36 Level  $\text{Cu}^{65}(\text{n}, \text{n}' \gamma)$   $E_n = 4.4$   
 $\gamma$  9† 1.12 2 scin  
†Relative to 0.97  $\gamma$  from same reaction on  $\text{Cu}^{63}$   
R.M.Sinclair, Bull. Am. Phys. Soc. 1, No. 1,  
42, K3 (1956); verbal report.

$\text{Zn}^{63}$   
30 33 Levels  $\text{Cu}^{63}(\text{p}, \text{n})$   $E_p = 4.2$  to  $5.3$ ; VdG  
Level thresh n,  $\sim 0^\circ$   
g.s.  $Q = -4.149$  4  
0.191 11  
0.642 11  
1.043 15

Graph of  $\sigma(\sim 0^\circ)$  given for n yield

R.M.Brugger, T.W.Bonner, J.B.Marion, Phys.  
Rev. 100, 84 (1955).

$\text{Zn}^{65}$   
30 35 Levels  $\text{Cu}^{(65)}(\text{p}, \text{n})$   $E_p \sim 2.9$   
100+ g.s.  $Q = -2.131$  5  
100+ 0.118 3  
0.052, 0.092 levels not observed ( $< \sim 20\%$ )  
n resonances in S used to select  $E_n$

J.B.Marion, R.A.Chapman, Phys. Rev. 100,  
1795A (1955); 101, 283 (1956).

Levels  $\text{Cu}^{65}(\text{p}, \text{n})$   $E_p = 2.1$  to  $4.1$ ; VdG  
Level thresh n,  $\sim 0^\circ$   
g.s.  $Q = -2.136$  4  
0.78 3  
1.26 3  
1.93 2

No indication of 0.052, 0.092, 0.114 levels  
Graph of  $\sigma(\sim 0^\circ)$  given for n yield

R.M.Brugger, T.W.Bonner, J.B.Marion, Phys.  
Rev. 100, 84 (1955).



$\text{Ga}^{66}$ 31 35 9.4 <sup>h</sup>	$\gamma(\text{Zn}^{66})$	$\text{Zn}^{(66)}(22\text{-Mev d, 2n})$ scin pr
	1.89	3.35
	2.14	3.76
	2.38	4.14
	2.73	4.27
	3.23	4.78

D.E. Alburger, B.J. Toppel, Phys. Rev. 100, 1357 (1955).

$\text{Ga}^{67}$ 31 36	Levels	$\text{Zn}^{67}(\text{p, n})$ g.s.	$E_p = 1.8$ to 3.9 thresh n, $\sim 0^\circ$
		0.357 7	1.235 15
		0.857 20	1.544 20

R.A. Chapman, J.B. Marion, J.C. Slattery, Bull. Am. Phys. Soc. 1, No. 2, 95, N3 (1956); verbal report.

$\text{Ga}^{68}$ 31 37	Levels	$\text{Zn}^{(68)}(\text{p, n})$ Level g.s.	$E_p = 2.7$ to 4.3 thresh n, $\sim 0^\circ$
		Q = -3.694 6	
		0.170 9	

R.M. Brugger, T.W. Bonner, J.B. Marion, Phys. Rev. 100, 84 (1955).

Levels	$\text{Zn}^{68}(\text{p, n})$ g.s.	$E_p = 3.6$ to 5.3 thresh n, $\sim 0^\circ$
	0.189 8	
	0.344 9	1.112 23
	0.578 12	1.234 23
	0.854 17	1.586 23

R.A. Chapman, J.B. Marion, J.C. Slattery, Bull. Am. Phys. Soc. 1, No. 2, 95, N3 (1956); verbal report.

$\text{Ga}^{69}$ 31 38	Level	$\text{Ga}^{69}(\alpha, \alpha')\gamma$ $\gamma$	$E_\alpha = 4.8$ scin
		0.324 $\epsilon B(E2) = 0.0079$	

L.W. Fagg, E.H. Geer, E.A. Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.

$\text{Ga}^{71}$ 31 40	Level	$\text{Ga}^{71}(\alpha, \alpha')\gamma$ $\gamma$	$E_\alpha = 4.4$ scin
		0.513 $\epsilon B(E2) = 0.012$	

L.W. Fagg, E.H. Geer, E.A. Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.

$\text{Ga}^{72}$ 31 41 14 <sup>h</sup>	$\gamma(\text{Ge}^{72})$	$\text{Ga}^{(71)}(\text{n}, \gamma)$ scin
	$\leq 0.8^\dagger$ 0.32 1	5 <sup>†</sup> 1.24 2
	$\leq 1.1^\dagger$ 0.39 1	$\leq 1.3^\dagger$ 1.32 3
	$\leq 1.8^\dagger$ 0.44 1	2.8 <sup>†</sup> 1.46 1
	3.7 <sup>†</sup> 0.51 1	7.8 <sup>†</sup> 1.59 2
	6.5 <sup>†</sup> 0.60	$\leq 2^\dagger$ 1.79 3
	22 <sup>†</sup> 0.63	8.4 <sup>†</sup> 1.88 1
	2 <sup>†</sup> 0.72 2	41 <sup>†</sup> (2.20)
	100 <sup>†</sup> (0.835)	$\leq 2^\dagger$ 2.40 2
	7 <sup>†</sup> 0.91 2	30 <sup>†</sup> (2.50) <sup>*</sup>
	9 <sup>†</sup> 1.04 1	0.6 <sup>†</sup> 2.82 1

Continued

$\text{Ga}^{72}$ 31 41 14 <sup>h</sup>	$\gamma$ 's in $\gamma(0.68 \text{ ce})$ delay spectrum
	0.03 <sup>†</sup> 0.115 4
	0.05 <sup>†</sup> 0.62 2 0.20 <sup>†</sup> 1.71 2
	0.04 <sup>†</sup> 0.73 3 0.07 <sup>†</sup> 1.82 4
	0.16 <sup>†</sup> 0.95 2 0.07 <sup>†</sup> 2.15 4
	0.04 <sup>†</sup> 1.34 6 0.08 <sup>†</sup> 2.69 3

Table of  $\beta\gamma$  given showing additional 1.68  $\gamma$  (0.84  $\gamma$ ) (0.63, 0.77, 0.89, 1.05, 1.30, 1.62, 1.87, 2.20, 2.50  $\gamma$ ) (0.63  $\gamma$ ) (0.62, 0.84, 1.05, 1.30, 1.48, 1.64, 1.79, 1.90  $\gamma$ ) (1.47  $\gamma$ ) (1.05, 1.30, 1.59, 1.90  $\gamma$ )

Decay scheme proposed with levels in  $\text{Ge}^{72}$ : g.s. ( $0^+$ ), 0.69 ( $\tau = 0.3 \mu\text{s}$ ,  $0^+$ ), 0.84 ( $2^+$ ), 1.46 ( $2^+$ ), 1.73 ( $2^+, 3^+$ ), 2.06 ( $2^+$ ), 2.39 ( $1^+, 2^+$ ), 2.51 ( $2^+$ ), 2.82 ( $1^+, 2^+$ ), 3.04 ( $2^-, 3^-$ ), 3.32 ( $2^-, 3^-$ ), 3.34 ( $2^-$ )

No 0.69 photon ( $\leq 2^\dagger$ )

\*Unresolved 2.508  $\gamma$  and 2.491  $\gamma$

J.J. Kraushaar, E. Brun, W.E. Meyerhof, Phys. Rev. 101, 139 (1956).

$\text{Ge}^{72}$ 32 40	Level	$\text{Ge}^{(72)}(\gamma, \gamma)$ (0.835)	$\text{As}^{72}$ recoil $\tau = 3.2 \mu\text{s}$ 8 $J = 2$ $\gamma, \gamma(\theta)$
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F.R. Metzger, Phys. Rev. 101, 286 (1956).

$\text{Ge}^{74}$ 32 42	Level	$\text{Ge}^{(74)}(\gamma, \gamma)$ (0.596)	$\text{As}^{74}$ recoil $\tau = 13 \mu\text{s}$ 2 $J = 2$ $\gamma, \gamma(\theta)$
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F.R. Metzger, Phys. Rev. 101, 286 (1956).

$\text{As}^{72}$ 33 39 26 <sup>h</sup>	1.5% of disintegrations lead to 0.3 $\mu\text{s}$ level in $\text{Ge}^{72}$ at 0.69 $\beta\gamma, \gamma\gamma$
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E. Brun, W.E. Meyerhof, J.J. Kraushaar, Phys. Rev. 100, 1795A (1955); verbal report.

$\text{As}^{74}$ 33 41	$\gamma$	$\text{As}^{75}(\gamma, \gamma')$ 0.305 15 $\tau = 12 \mu\text{s}$ 3	$E_\gamma \leq 19.5$ scin
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S.H. Vegors, Jr., P. Axel, Phys. Rev. 100, 1238A (1955); verbal report.

$\text{As}^{75}$ 33 42	$\gamma$	$\text{As}^{75}(\text{n}, \text{n}'\gamma)$ 0.815 10 1.02 1	$E_n = 3.7$ ; scin
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M.A. Rothman, H.S. Hans, C.E. Mandeville, Phys. Rev. 100, 83 (1955).

$\text{As}^{76}$ 33 43 26 <sup>h</sup>	$\gamma(\text{Se}^{76})$	0.5605 3	cryst
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N. Ryde, B. Andersson, Proc. Phys. Soc. 68B, 1117 (1955).

<sup>As</sup><sub>33</sub><sup>76</sup><sub>43</sub><sup>26</sup><sub>h</sub> (0.64 γ)(0.55 γ) delay = 23<sup>μs</sup> 15 scin  
C.F.Coleman, Phil. Mag. 46, 1135 (1955).

<sup>As</sup><sub>33</sub><sup>85</sup><sub>52</sub> Assignment here of 0.43<sup>s</sup> delayed-n activity accounts for fission yields in Kr region of U<sup>233</sup>, U<sup>235</sup>, U<sup>238</sup>, Pu<sup>239</sup>  
[E<sub>β</sub> > 9, B<sub>n</sub>(Se<sup>85</sup>) ~ 5 from systematics]  
W.H.Fleming, quoted by R.K.Wanless, H.G. Thode, Can. J. Phys. 33, 541 (1955).

<sup>Se</sup><sub>34</sub> γ Se(n, n' γ) E<sub>n</sub> = 3.7; scin  
1.05 2  
1.50 3

M.A.Rothman, H.S.Hans, C.E.Mandeville, Phys. Rev. 100, 83 (1955).

Resonance peaks	Se(n) E <sub>o</sub> (ev)	σ <sub>o</sub> Γ <sup>2</sup>	E <sub>n</sub> = 1 to 2000 ev
27.1		53	chopper
211		1410	
270		3520	
383		920	

L.M.Bollinger, D.A.Dahlberg, R.R.Palmer, G.E.Thomas, Phys. Rev. 100, 126 (1955).

Resonance peaks	Se(n) E <sub>o</sub> (ev)	A*	E <sub>o</sub> (ev)	A*
212	78		973	78
272			1970	81
383			3110	
673	78		4120	81
884			5340	81

\*Product A assignment from enriched samples

J.M.LeBlanc, L.M.Bollinger, R.E.Coté, Phys. Rev. 100, 1248A (1955); verbal report.

<sup>Se</sup><sub>34</sub><sup>73</sup><sub>39</sub><sup>7.1</sup><sub>h</sub> β<sup>+</sup> 100† 1.29 1 Ge(<sup>70</sup>) (28-Mev α, n) chem sl  
≤ 1†<sup>‡</sup> 1.65 2  
γ(As<sup>73</sup>) α<sub>K</sub><sup>\*</sup> K/LM sl ce,  
126† 0.0658 1 0.22 10.2 M1 scin  
154† 0.359 1 0.011 8 M2  
γ<sup>‡</sup> (0.066, 0.359 γ) delay = 6.0<sup>μs</sup> 2  
(0.066 γ)(0.359 γ) γ<sup>‡</sup> (0.066 γ) delay < 5<sup>mμs</sup>  
No other γ (< 2†)  
<sup>‡</sup>From ε<sup>μs</sup> delay for ≥ 99% of γ<sup>‡</sup> (0.066 γ)  
\*From ce<sub>K</sub> per β<sup>+</sup> and theoretical ε/β<sup>+</sup> ratio

R.W.Hayward, D.D.Hopson, Phys. Rev. 101, 93 (1956); 98, 1172A (1955).

<sup>Se</sup><sub>34</sub><sup>75</sup><sub>41</sub><sup>127</sup><sub>d</sub> (0.097 γ)(0.280 γ) delay = 18.0<sup>ms</sup> 15 scin  
A.W.Schardt, Bull. Am. Phys. Soc. 1, No. 2, 85, D1 (1955).

Compare As<sup>74</sup>? on card 56-1-38

<sup>Se</sup><sub>34</sub><sup>78</sup><sub>44</sub> Resonance Se<sup>77</sup>(n) chopper  
peaks E<sub>o</sub>(ev) E<sub>o</sub>(ev)  
212 973  
673

J.M.LeBlanc, L.M.Bollinger, R.E.Coté, Phys. Rev. 100, 1248A (1955); verbal report.

<sup>Se</sup><sub>34</sub><sup>81</sup><sub>47</sub> Resonance Se<sup>80</sup>(n) chopper  
peaks E<sub>o</sub>(ev) E<sub>o</sub>(ev)  
1970 5340  
4120

J.M.LeBlanc, L.M.Bollinger, R.E.Coté, Phys. Rev. 100, 1248A (1955); verbal report.

Br ? γ Br(γ, γ γ) E<sub>γ</sub> ≤ 22; scin  
35 0.155 10<sup>\*</sup> γγ delay = 130<sup>μs</sup> 20  
0.270 15 γγ delay = 32<sup>μs</sup> 10  
\*Threshold = 9.85 25

S.H.Vegors, Jr., R.B.Duffield, Bull. Am. Phys. Soc. 1, No. 4, 206 R1 (1956); verbal report.

<sup>Br</sup><sub>35</sub><sup>79</sup><sub>44</sub> Level Br<sup>79</sup>(α, α' γ) E<sub>α</sub> = 3.6; scin  
γ 0.219 εB(E2) = 0.025  
No other γ

E.A.Wolicki, L.W.Fagg, E.H.Geer, Phys. Rev. 100, 1265A (1955); verbal report.

Br <sup>80</sup> 35 45	Resonance peaks	Br <sup>79</sup> (n) E <sub>o</sub> (ev)	Γ (ev)	Γ <sub>γ</sub> (ev)	chopper
	3700	35.4	0.44	0.395	
	1670	54.3	0.375	0.347	
	1320	188	0.450	0.364	
		204*			
		238			
		293*			
		318			
		392*			
		467*			

\*May be in Br<sup>82</sup>

J.M.LeBlanc, L.M.Bollinger, R.E.Coté, Phys. Rev. 100, 1248A (1955); verbal report.

<sup>Br</sup><sub>35</sub><sup>81</sup><sub>46</sub> Level Br<sup>81</sup>(α, α' γ) E<sub>α</sub> = 3.6; scin  
γ 0.278 εB(E2) = 0.031

E.A.Wolicki, L.W.Fagg, E.H.Geer, Phys. Rev. 100, 1265A (1955); verbal report.

<sup>Br</sup><sub>35</sub><sup>82</sup><sub>47</sub> Resonance Br<sup>81</sup>(n) chopper  
peaks E<sub>o</sub>(ev) E<sub>o</sub>(ev)  
101 293\*  
135 392\*  
204\* 467\*

Other peaks at 553, 669, 1540 ev  
\*May be in Br<sup>80</sup>

J.M.LeBlanc, L.M.Bollinger, R.E.Coté, Phys. Rev. 100, 1248A (1955); verbal report.

$\text{Kr}^{80}$ 36 44	Level $\gamma$	$\text{Kr}^{(80)}(\alpha, \alpha'\gamma)$ 0.610	$E_\alpha = 6.6$ scin	$\text{Rb}^{83}$ 37 46 83 <sup>d</sup>	$\tau$ d 38 <sup>b</sup> Sr chem	100 <sup>d</sup>	Ag(480-Mev p) chem
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N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

B.V.Kurchatov, V.N.Mekhedov, N.I.Borisova, M.Y.Kuznetsova, L.N.Kurchatova, L.V.Christyakov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 178 July (1955); Consultants Bureau Trans. p. 111.

$\text{Kr}^{82}$ 36 46	Level $\gamma$	$\text{Kr}^{(82)}(\alpha, \alpha'\gamma)$ 0.775	$E_\alpha = 6.6$ scin
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N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$\text{Kr}^{83}$ 36 47	ground state J q	9/2 +0.22 2	enriched $\text{Kr}^{83}$ S
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E.Rasmussen, V.Middelboe, Kgl. Danske Videnskab. Selskab Mat.-fys. Medd. 30, No. 13 (1955).

Level $\gamma$	$\text{Kr}^{(83)}(\alpha, \alpha'\gamma)$ 0.457	$E_\alpha = 6.6$ scin
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N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956).

$\text{Kr}^{84}$ 36 48	Level $\gamma$	$\text{Kr}^{(84)}(\alpha, \alpha'\gamma)$ 0.880	$E_\alpha = 6.6$ scin
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N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$\text{Kr}^{85}$ 36 49 4.4 <sup>h</sup>	IT 22% From $10.3^y\text{Kr}^{85}/\text{Rb}^{85}$ yield Authors conclude $\text{U}^{235}$ fission yield is a smooth function of A in this region	$\text{U}^{235}(\text{n}, \text{f})$ ms
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A.T.Biades, H.G.Thode, Z. Naturf. 10a, 838 (1955).

s  $\text{Rb}^{85}$  recoil  
Charges 1 to 11 (av. = 1.51) found on recoils

A.H.Snell, F.Pleasanton, Bull. Am. Phys. Soc. 1, No. 1, 42, K6 (1956); verbal report.

$\text{Rb}^{84}$ 37 47 34 <sup>d</sup> g. s.	$\tau$ $\beta^+$ $\beta^-$ $\gamma(\text{Kr}^{84})$	33.0 <sup>d</sup> 2 15† 0.81 5 15† 1.70 7 3.7† * 0.910 * 100† 0.89 2 1.4† 1.91 5	$\text{Br}^{(81)}(14\text{-Mev } \alpha, \text{n})$ chem scin sl scin
	No 1.02 $\gamma$ (<0.5†) (~0.8 $\beta$ ) $\gamma$ (K x ray)(0.89, 1.91 $\gamma$ ) (0.81 $\beta^+$ )/(0.89 $\gamma$ ) = 0.150 11 $\epsilon(0.89 \text{ level})/\epsilon(\text{total}) = 0.71$ 3	(0.89 $\gamma$ ) $\gamma$ $\alpha\beta\gamma$ $\gamma^+(0.89 \gamma)$ $\gamma^+\gamma/\gamma$ $x\gamma/x$	

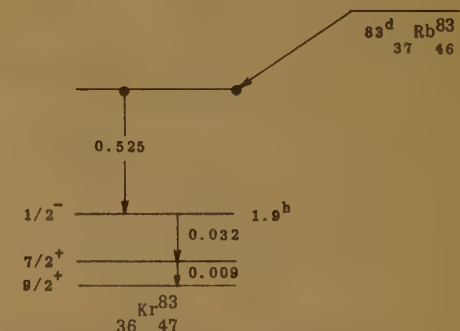
$\text{Rb}^{80}$ 37	$\tau$	8 <sup>d</sup>	Ag(480-Mev p) chem
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B.V.Kurchatov, V.N.Mekhedov, N.I.Borisova, M.Y.Kuznetsova, L.N.Kurchatova, L.V.Christyakov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 178 July (1955); Consultants Bureau Trans. p. 111.

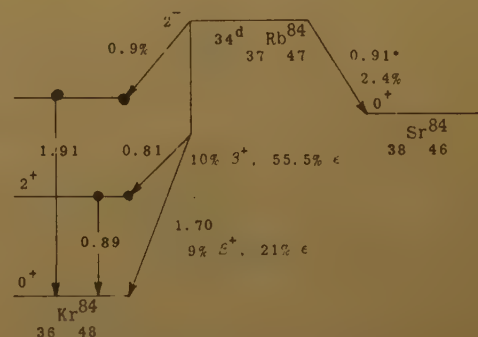
$\text{Rb}^{82}$ 37 45 1.3 <sup>m</sup> g.s.	$\tau$ $\beta^+$ d 25 <sup>d</sup> Sr chem	1.1 <sup>m</sup> 2 3.5	Ag(480-Mev p) chem
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B.V.Kurchatov, V.N.Mekhedov, N.I.Borisova, M.Y.Kuznetsova, L.N.Kurchatova, L.V.Christyakov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 178 July (1955); Consultants Bureau Trans. p. 111.

$\gamma(\text{Kr}^{83})$ (K x ray)(0.525 $\gamma$ ) $\epsilon(0.566 \text{ level})/\epsilon(\text{total}) = 1.0 \pm 0.1$ No $\beta$ with $E_\beta > 0.04$ (<1%)	0.525 7 scin $x\gamma/x$
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M.L.Perlman, J.P.Welker, Phys. Rev. 100, 81 (1955).



J.P.Welker, M.L.Perlman, Phys. Rev. 100, 74 (1955); \*C.S.Wu, N.Benczer, ibid.



$\text{Rb}^{85}$  Level  $\text{Rb}^{85}(\alpha, \alpha'\gamma)$   $E_\alpha = 4.4$   
 37 48  $\gamma$  0.148  $\epsilon B(E2) = 0.0032$  scin  
 L.W.Fagg, E.H.Geer, E.A.Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.

$\gamma(\text{Sr}^{88})$  0.909 100% dipole scin  
 39 49 1.850 100% quadrupole  
 105<sup>d</sup> (0.909  $\gamma$ )(1.850  $\gamma$ )( $\theta$ )  $J = 3, 2, 0$   
 g.s.  
 E.D.Klema, Bull. Am. Phys. Soc. 1, No. 2, 85, D2 (1956).

$\text{Rb}^{86}$   $\beta^-$  1 to 5+ 0.230 20 s  
 37 49 14+ 0.711 15  
 19<sup>d</sup> 86+ 1.795 15  $\Delta J = 2$ , yes shape  
 g.s.  
 $\gamma(\text{Sr}^{86})$  0.527 3 s ce  
 1.081 4  
 A.G.Dmitriev, P.P.Zarubin, Izvest. Akad. Nauk Ser. Fiz. SSSR 18, 580 (1954).

$\gamma^{89}$  Levels  $\gamma^{89}(n, n')^{16}\text{S} \gamma$   $E_n = 0.9$  to 1.8  
 39 50 (0.91)  $\tau = 16.1^s$  3  
 1.2  
 1.2 level feeds  $16^s$  state; 1.53 level does not  
 C.P.Swann, F.R.Metzger, Phys. Rev. 100, 1329 (1955).

$\text{Rb}^{87}$   $\tau$   $5.0 \times 10^{10} \text{y}$  2 ms  
 37 50 From  $\text{Sr}^{87}/\text{Rb}^{87}$  in rocks of known ages (Pb/U)  
 $\sim 5 \times 10^{10} \text{y}$  no appreciable Rb, Sr separation found

G.W.Wetherill, L.T.Aldrich, G.R.Tilton, G.L. Davis, Bull. Am. Phys. Soc. 1, No. 1, 31, H6 (1956).

Zr Levels  $\text{Zr}(n, n')$   $E_n = 4.3$ ; scin  
 40 g.s. pulsed n's  
 1.4  
 2.2  
 2.8 ?

No 0.90 level

R.V.Smith, Bull. Am. Phys. Soc. 1, No. 1, 55, R6 (1956); verbal report.

$\tau$   $4.3_{-2}^{+3} \times 10^{10} \text{y}$  specific activity  
 No  $\gamma$ , no ce  $2\pi \text{pc } \beta\gamma, \beta(\text{ce})$   
 \*Assuming 27.85%  $\text{Rb}^{87}$  in natural Rb

I.Geese-Bähnisch, Z. Phys. 142, 565 (1955);  
 I.Geese-Bähnisch, E.Huster, Naturwiss. 41, 495 (1954).

$\gamma$   $\text{Zr}(n, n'\gamma)$   $E_n = 0.35$  to 3.9  
 $E_\gamma$  Thresh scin  
 0.552 5 1.48 5  
 0.916 15 0.92 2  
 1.46 3 1.46 3

Probably due to  $\text{Zr}^{92}$ ,  $\text{Zr}^{94}$

$\text{Rb}^{87}$  Level  $\text{Rb}^{87}(\alpha, \alpha'\gamma)$   $E_\alpha = 4.4$   
 37 50  $\gamma$  0.407  $\epsilon B(E2) = 0.0058$   
 L.W.Fagg, E.H.Geer, E.A.Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.

R.B.Day, A.E.Johnsrud, D.A.Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956).

$\gamma$   $\text{Zr}(n, n'\gamma)$   $E_n = 0.9$  to 2.2  
 0.930 scin  
 No other  $\gamma$  observed with  $0.6 < E_\gamma < 2$

J.B.Guernsey, C.Goodman, Phys. Rev. 101, 294 (1956).

$\text{Sr}^{83}$   $\tau$   $34^h$  Ag(480-Mev p) chem  
 38 45 p  $83^d\text{Rb}$  chem  
 38<sup>h</sup>  
 B.V.Kurchatov, V.N.Mekhedov, N.I.Borisova  
 M.Y.Kuznetsova, L.N.Kurchatova, L.V.  
 Christyakov, Conf. Acad. Sci. on Peaceful  
 Use of Atomic Energy, Chem. Sci. p. 178  
 July (1955); Consultants Bureau Trans. p. 111.

Zr<sup>89</sup>  $\text{Zr}^{(90)}(\gamma, n)$   
 40 49 Threshold for  $4.3^m\text{Zr}^{89}$  ( $J = 1/2$ ) = 12.37 9  
 Small yield of  $79^h\text{Zr}^{89}$  ( $J = 9/2$ ) observed in  
 region  $E_\gamma = 12.2$  (expected threshold = 11.78)

J.D.Fox, P.Axel, Phys. Rev. 100, 1249A (1955); verbal report.

$\text{Sr}^{87}$   $\gamma$  (0.388)  $\alpha = 0.26$  3 GM  
 38 49 Authors conclude  $\gamma$  is E5  
 2.8<sup>h</sup>  
 I.V.Estulin, E.M.Moiseeva, Soviet Phys. JETP  
 1, 463 (1955); Zhur. Ekspitl' i Teoret. Fiz.  
 28, 541 (1955).

Zr<sup>90</sup>  $\gamma$   $\text{Zr}^{(90)}(n, n'\gamma)$   $E_n = 0.35$  to 3.9  
 40 50 2.17 3 Thresh = 2.20 3 scin  
 2.30 3  
 3.29 10

Also  $\gamma^+$  with threshold at 1.77 3 due to pairs  
 from  $0^+$  level at 1.77

$\text{Sr}^{89}$  p  $14^s\text{Y}^{89}$  (0.02%) 0.91  $\gamma/\beta$   
 38 51  
 51<sup>d</sup> W.S.Lyon, R.R.Rickard, Phys. Rev. 100, 112 (1955).

R.B.Day, A.E.Johnsrud, D.A.Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956); verbal report.

$\text{Zr}^{91}$   
40 51  $\mu$  ground state  
-1.9 2 S  
K. Murakawa, Phys. Rev. 100, 1369 (1955).

Level  $\text{Zr}^{(91)}(n, n'\gamma) E_n = 0.35$  to 3.9  
 $\gamma$  1.22 3 Thresh = 1.26 5 scin

R. B. Day, A. E. Johnsrud, D. A. Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956); verbal report.

$\text{Zr}^{95}$   
40 55  $\beta^-$  11% 0.250 30 S  
65 d 53% 0.364 8  
34% 0.404 8  
0.9% 0.90 3  
0.4% 1.13 4  
 $\gamma(\text{Nb}^{95})$  0.723 2 M1, E2 s ce  
0.756 2 E1  
p  $90^h\text{Nb}^{95}$  (0.235  $\gamma$  observed)

P. P. Zarubin, Izvest. Akad. Nauk Ser. Fiz. SSSR 18, 563 (1954).

$\text{Zr}^{96}$   
40 56  $\tau_{\beta\beta}$  93%  $\text{Zr}^{96}$ ;  $4\pi$  scin  
>  $5 \times 10^{17} \text{y}$   $\beta\beta$   
>  $3.6 \times 10^{17} \text{y}$   $\beta$   
Search covered  $2.5 < E_\beta < 4.25$  and  $3.0 < E_\beta < 4.5$   
Long  $\tau$  suggests  $\nu$  and anti- $\nu$  are nonidentical

M. A. Schalom, Bull. Am. Phys. Soc. 1, No. 1, 31, H7 (1956); verbal report.

Nb ?  $\gamma$   $\text{Nb}^{93}(\gamma, \gamma) E_\gamma \leq 22$ ; scin  
41 0.088 5  $\gamma\gamma$  delay =  $6.0 \mu\text{s}$  15

S. H. Vegors, Jr., R. B. Duffield, Bull. Am. Phys. Soc. 1, No. 4, 206 R1 (1956).

$\text{Nb}^{90}$   
41 49  $\beta^+$  1.51 3 scin  
15 h  $\gamma(\text{Zr}^{90})$  10.4† 1.82 scin  
g.s. 8† 0.14\* 11.5† 1.96  
180† 1.14 150† 2.32 2  
(~0.14  $\gamma$ )( $\gamma^\pm$ , 1.14, 1.82, 2.19  $\gamma$ )  
(1.51  $\beta$ )(1.14  $\gamma$ ) No (2.32  $\gamma$ )  $\gamma$   
\*Coincidence measurements imply two 0.14  $\gamma$ 's

N. H. Lazar, G. D. O'Kelley, Bull. Am. Phys. Soc. 1, No. 4, 163 B9 (1956); verbal report.

$\text{Nb}^{92}$   
41 51  $\gamma$   $\text{Nb}^{93}(\gamma, n\gamma) E_\gamma \leq 19.5$   
0.085 5  $\tau = 6.0 \mu\text{s}$  5 scin

R. B. Duffield, S. H. Vegors, Jr., quoted by S. H. Vegors, Jr., P. Axel, Phys. Rev. 100, 1238A (1955); verbal report.

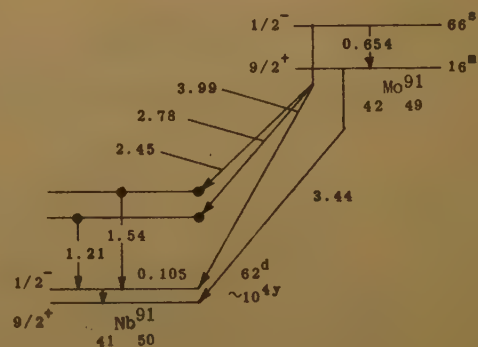
$\text{Nb}^{95}$   
41 54  $\beta^-$  0.162 5  $65^d\text{Zr}^{95}$  source; s  
35 d  $\gamma(\text{Mo}^{95})$  0.764 2 s ce  
g.s.  
P. P. Zarubin, Izvest. Akad. Nauk Ser. Fiz. SSSR 18, 563 (1954).

$\text{Mo}^{90}$   
42 48  $\tau$  6.4<sup>h</sup> Ag(550-Mev  $\alpha$ ) chem  
5.7<sup>h</sup> p  $15^h\text{Nb}$  chem

B. V. Kurchatov, V. N. Mekhedov, N. I. Borisova, M. Y. Kuznetsova, L. N. Kurchatova, L. V. Christyakov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 178 July (1955); Consultants Bureau Trans. D. 111.

$\text{Mo}^{91}$   
42 49  $\beta^+$  3.44  $\text{Mo}^{(92)}(\leq 22\text{-Mev } \gamma, n)$ ; s  
16 m No (3.44  $\beta$ )  $\gamma$  scin  
g.s.  
N. Gove, F. A. Smith, R. A. Becker, Phys. Rev. 100, 1236A (1955); verbal report.

$\text{Mo}^{91}$   
42 49  $\beta^+$  51† 2.45  $\text{Mo}^{(92)}(\leq 22\text{-Mev } \gamma, n)$ ; s  
66 s 35.8† 2.78  
13.2† 3.99  
 $\gamma$  8.9\* 0.654 3  $\alpha = 0.055$  s ce, scin  
 $\gamma(\text{Nb}^{91})$  1.21 scin  
1.54  
(2.78  $\beta$ )(1.21  $\gamma$ ) (2.45  $\beta$ )(1.54  $\gamma$ )  
No  $\beta$  (0.654  $\gamma$ )  
\*ce per 100  $\beta^+$



N. Gove, F. A. Smith, R. A. Becker, Phys. Rev. 100, 1236A (1955); verbal report.

$\text{Mo}^{95}$   
42 53 ground state 5/2 para

J. Owen, I. M. Ward, Phys. Rev. 102, 591 (1956).

ground state 7/2 S

K. Murakawa, Phys. Rev. 100, 1369 (1955).

$\text{Mo}^{97}$   
42 55 J ground state  
5/2 para  
J. Owen, I. M. Ward, Phys. Rev. 102, 591 (1956).

ground state  
J 7/2 S  
K. Murakawa, Phys. Rev. 100, 1369 (1955).

$\text{Mo}^{99}$  ?  $\gamma$   $\text{Mo}^{(100)}$  ( $\gamma, n\gamma$ )  $E_\gamma \leq 19.5$   
42 57 0.098 5  $\tau = 16.5 \mu\text{s}$  12 scin  
Threshold =  $8.4 \pm 0.6$

S. H. Vegors, Jr., P. Axel, Phys. Rev. 100,  
1238A (1955); verbal report.

$\text{Mo}^{105}$   $< 2^m$  U(fast n, f) chem  
42 63  $\sim 5^m$   
J. Flegenhimer, G. B. Baró, A. Medina, Z.  
Naturf. 10a, 798 (1955).

$\text{Tc}^{105}$   $\tau$   $10^m$  1 U(fast n, f) chem  
43 62  $10^m$  p 4.4<sup>h</sup>  $\text{Ru}^{105}$   
J. Flegenhimer, G. B. Baró, A. Medina, Z.  
Naturf. 10a, 798 (1955).

$\text{Ru}^{95}$   $\tau$   $1.7^h$  1 Ag(480-Mev p) chem  
44 51  $1.6^h$   
B. V. Kurchatov, V. N. Mekhedov, N. I. Borisova  
M. Y. Kuznetsova, L. N. Kurchatova, L. V.  
Christyakov, Conf. Acad. Sci. on Peaceful  
Use of Atomic Energy, Chem. Sci. p. 178  
July (1955); Consultants Bureau Trans. p. 111.

$\text{Ru}^{99}$  ground state  
44 55 J 5/2 natural Ru; S  
 $\mu$  -0.63° 15  
\*Calculated from  $\bar{\mu}$  (for A = 99, 101) = -0.66 2,  
using  $\mu_{101}/\mu_{99} = 1.09$  3<sup>5</sup>

K. Murakawa, J. Phys. Soc. Japan 10, 919  
(1955); 9, 427, 651 (1954). §J. H. E. Griffiths,  
J. Owen, Proc. Phys. Soc. 65A, 951 (1952).

$\text{Ru}^{101}$  ground state  
44 57 J 5/2 natural Ru; S  
 $\mu$  -0.69° 15  
\*Calculated from  $\bar{\mu}$  (for A = 99, 101) = -0.66 2,  
using  $\mu_{101}/\mu_{99} = 1.09$  3<sup>5</sup>

K. Murakawa, J. Phys. Soc. Japan 10, 919  
(1955); 9, 427, 651 (1954). §J. H. E. Griffiths,  
J. Owen, Proc. Phys. Soc. 65A, 951 (1952).

$\text{Rh}^{103}$  Level  $\text{Rh}^{103}$  (p, p'  $\gamma$ )  
45 58  $\gamma$  0.305 E2/M1 = 0.032 p,  $\gamma$  (L)  
B(E2) = 0.208

P. H. Stelson, F. K. McGowan, Bull. Am. Phys. Soc.  
1, No. 4, 164 C2 (1956); verbal report.

$\text{Rh}^{106}$   $\gamma$  ( $\text{Pd}^{106}$ )  $1.0^y \text{Ru}^{106}$  source  
45 61 100<sup>†</sup> 0.513 scin pr,  
30<sup>s</sup> 53<sup>†</sup> 0.624 1.0<sup>†</sup> 1.77 4 scin  
g.s. 3<sup>†</sup> 0.87 0.6<sup>†</sup> 1.96 5  
8<sup>†</sup> 1.045 0.5<sup>†</sup> 2.10 5  
 $\leq 0.8^{\dagger}$  1.14 ? 1.0<sup>†</sup> 2.37 6  
2.5<sup>†</sup> 1.55 4 0.2<sup>†</sup> 2.66 7  
No 0.41 $\gamma$  (< 2<sup>†</sup>) scin  $\gamma\gamma$  scin  
No 0.22, 0.72, 0.805, ~1.21, 1.39, 1.85  $\gamma$   
(0.513 $\gamma$ )(0.62, 1.04 $\gamma$ ; others with  $E_\gamma < 2.0$ )  
(1.04 $\gamma$ )(0.87 $\gamma$ )  
Decay scheme proposed

D. E. Alburger, B. J. Toppel, Phys. Rev. 100,  
1357 (1955).

$\text{Pd}$  ?  $\gamma$   $\text{Pd}(\gamma, \gamma)$   $E_\gamma \leq 19.5$   
46 0.165 16 }  $\tau = 33 \mu\text{s}$  6 scin  
0.305 15

S. H. Vegors, Jr., P. Axel, Phys. Rev. 100,  
1238A (1955); verbal report.

$\text{Pd}^{100}$   $\tau$   $4.1^d$  2 Ag(480-Mev p) chem  
46 54  $4.0^d$   
B. V. Kurchatov, V. N. Mekhedov, N. I. Borisova  
M. Y. Kuznetsova, L. N. Kurchatova, L. V.  
Christyakov, Conf. Acad. Sci. on Peaceful  
Use of Atomic Energy, Chem. Sci. p. 178  
July (1955); Consultants Bureau Trans. p. 111.

Ag Levels Ag(p, p'  $\gamma$ )  
47  $\gamma$  ~0.315 E2/M1 = 0.032 p,  $\gamma$  (L)  
B(E2) = 0.226

P. H. Stelson, F. K. McGowan, Bull. Am. Phys.  
Soc. 1, No. 4, 164 C2 (1956); verbal report.

Resonances	Ag(n, $\gamma$ ) $E_0$ (ev)	$\Gamma$ (ev)	pulsed n's: $\sigma_0 \Gamma$	scin $\gamma$ $E_n^{\text{scin}}$ (mev)
	16.3	0.12	250	0.39
	30.5	0.12	250	0.7
	40.5	~0.05	249	0.6
	41.6	~0.5	240	0.6
	45.0	0.16	24	0.06
	51.6	0.13	470	1.3
	55.9	$E_0$ (ev)		$E_0$ (ev)
	71.2	139.6		203
	88.0	143.7		209
	133.4	173		250

W. W. Havens, Jr., G. Grim, J. S. Desjardins, J.  
Rosen, J. Rainwater, Bull. Am. Phys. Soc. 1,  
No. 4, 177 F15 (1956); verbal report.

$\text{Ag}^{103}$   $\tau$   $59^m$  6 Ag( $^{107}$ )(50-Mev p, 5n  $\beta$ ) chem  
47 56  $59^m$   
F. A. Johnson, Can. J. Phys. 33, 841 (1955).





Cd ?	Unassigned ce	Ag(50-Mev p) chem
48	0.06065	$s\pi$ ce
	0.12345	0.5597 0.6312
	0.12461	0.5949 0.6599
	0.15437	0.6005 0.6645
	0.15832	0.6009 0.6691
	0.2285	0.6048 0.6846
	0.5338	0.6267 0.7337
	0.5550	0.6291 0.7436

Assignable to Cd or daughter activities

F.A. Johnson, Can. J. Phys. 33, 841 (1955).

Cd <sup>111</sup>	Levels	Cd <sup>111</sup> (p, p' $\gamma$ )	E <sub>p</sub> = 3.0
48 63		0.342 level	scin
	$\gamma$	13% 0.092	
		13% 0.250	
		87% 0.342 B(E2) = 0.10	
		(0.092 $\gamma$ )(0.250 $\gamma$ )	
		0.610 level	
	$\gamma$	2% { 0.270 0.092	
		0.360 0.250	
		98% 0.610 B(E2) = 0.12 0.342	
		(0.270 $\gamma$ )(0.342 $\gamma$ ) (0.360 $\gamma$ )(0.250 $\gamma$ )	

F.K. McGowan, P.H. Stelson, M.M. Bretscher, Bull. Am. Phys. Soc. 1, No. 4, 164 C1 (1956); verbal report.

Cd	Levels	Cd(n, n' $\gamma$ )	E <sub>n</sub> = 2.45
48			
	39†	0.64	pulsed n' s
	30†	1.36	
	30†	1.49	
	†(90°) in mb/sterad		

L. Cranberg, J.S. Levin, Bull. Am. Phys. Soc. 1, No. 1, 56, R10 (1956); verbal report.

Cd <sup>113</sup>	Levels	Cd <sup>113</sup> (p, p' $\gamma$ )	E <sub>p</sub> = 3.0
48 65			scin
5.1 <sup>y</sup>	$\gamma$	~0.1† 0.265 E5	scin $\gamma/\beta$
	Most K x rays observed ascribed to Cd <sup>109</sup> scin		
	†Photons per 100 $\beta$		

E. der Mateosian, M. Goldhaber, Bull. Am. Phys. Soc. 1, No. 4, 207 R6 (1956).

$\gamma$	Cd(n, n' $\gamma$ )	E <sub>n</sub> = 3.2
	0.57	scin
	2.8	

I.L. Morgan, Bull. Am. Phys. Soc. 1, No. 2, 96, N11 (1956).

Cd <sup>113</sup>	Level	Cd <sup>113</sup> (p, p' $\gamma$ )	E <sub>p</sub> = 3.0
48 65	$\gamma$	0.300 E2/M1 = 0.084 p, $\gamma$ (L)	scin
		B(E2) = 0.100	

P.H. Stelson, F.K. McGowan, Bull. Am. Phys. Soc. 1, No. 4, 164 C2 (1956); verbal report.

Cd <sup>104</sup>	$\tau$	59 <sup>m</sup> 2	Ag( <sup>107</sup> ) (50-Mev p, 4n) chem
48 56			
59 <sup>m</sup>	No $\beta^+$		sl
	$\gamma$ (Ag <sup>104</sup> )		
	40°	0.0667	K/L <sub>1</sub> = 10 M1 $s\pi$ ce
	500°	0.0836	K/L <sub>1</sub> = 8 M1
			L <sub>1</sub> :L <sub>2</sub> :L <sub>3</sub> = 60:2:1
	2°	0.1236	
	2°	0.1342	
	*Relative ce <sub>K</sub> intensities		

F.A. Johnson, Can. J. Phys. 33, 841 (1955); Proc. Roy. Soc. Canada 46, 135A (1952).

Levels	Cd <sup>113</sup> (p, p' $\gamma$ )	E <sub>p</sub> = 3.3
	0.582 level	scin
$\gamma$	16% 0.282	
	16% 0.300	
	84% 0.582 B(E2) = 0.276	
	(0.282 $\gamma$ )(0.300 $\gamma$ )	
	0.675 level	
$\gamma$	2% 0.300	
	2% 0.375	
	98% 0.675	
	(0.375 $\gamma$ )(0.300 $\gamma$ )	

F.K. McGowan, P.H. Stelson, M.M. Bretscher, Bull. Am. Phys. Soc. 1, No. 4, 164 C1 (1956); verbal report.

$\tau$	54 <sup>m</sup> 1	Ag(480-Mev p) chem
		B.V. Kurchatov, V.N. Mekhedov, N.I. Borisova
		M.Y. Kuznetsova, L.N. Kurchatova, L.V.
		Christyakov, Conf. Acad. Sci. on Peaceful
		Use of Atomic Energy, Chem. Sci. p. 178
		July (1955); Consultants Bureau Trans. p. 111.

Cd <sup>111</sup>	Level	Cd <sup>111</sup> (p, p' $\gamma$ )	E <sub>p</sub> = 3.0
48 63			scin
$\gamma$	0.342	E2/M1 = 0.152 p, $\gamma$ (L)	
		B(E2) = 0.100	

P.H. Stelson, F.K. McGowan, Bull. Am. Phys. Soc. 1, No. 4, 164 C2 (1956); verbal report.

Cd <sup>114</sup>	Capture $\gamma$ 's	Cd <sup>113</sup> (th n, $\gamma$ )	$s\pi$ Cp
48 66			
	42†	0.56 1 2.5† 2.78 2	
	14†	0.66 1 2.91 3	
	7.5†	0.73 1 3.00 3	
	2†	~0.76 2 ~3.41 4	
	7†	0.82 1 ..	
	4†	1.23 1.5 1† 5.07 7	
	4†	1.31 2 2† 5.33 7	
	5†	1.37 2 1† 5.50 6	
	3†	1.42 2 1.8† 5.72 10	
	3†	1.52 2 3.5† 5.97 7	
	3†	1.63 2 1.3† 6.06 10	
	2†	1.79 2 6.75 5	
		1.82 2 0.8† 6.91 5	

Continued

$\text{Cd}^{114}$   
48 86

1.87 2	0.2†	7.12 5
2.15 3	0.1†	~7.46 5
2.28 3	0.6†	7.71 5
5† 2.45 2	0.5†	7.86 5
4† 2.56 2	0.4†	8.48 3
4† 2.68 2	0.2†	9.04 3

Levels proposed at 0.55, 1.20, 1.28, 1.38, 1.85,

2.15, 2.28, 3.00, 3.08, 3.33, 3.55, 3.72, 3.98

\*Lines not resolved

†Photons/100 Cd captures

B.P. Adyasevich, B.D. Groshev, A.M. Demidov,  
Conf. Acad. Sci. USSR on Peaceful Use of  
Atomic Energy, Phys. Math. Sci. p. 270 July  
(1955); Consultants Bureau Trans. p. 195.

$\text{Cd}^{116}$   $\tau_{\beta\beta} > 3 \times 10^{16} \text{y}$  81%  $\text{Cd}^{116}$ ;  $\Sigma$  scin  
48 68  
From absence of counts from 2 to 3.5 Mev

J.F. Detoef, R. Moch, J. phys. radium 16, 897  
(1955); Compt. rend. 241, 393 (1955).

In  $\gamma$  In(n,n' $\gamma$ )  $E_n = 0.35$  to 3.9  
49 65  
0.26 scin  
0.50 1.11  
0.91 1.42

R.B. Day, A.E. Johnsrud, D.A. Lind, Bull. Am.  
Phys. Soc. 1, No. 1, 56, R9 (1956).

In  $\tau \sim 30^m$   $\text{Cd}^{108}$  (7.8-Mev d,n) chem  
49 53  
33<sup>m</sup>  $\beta^+$  ~2 scin  
 $\gamma(\text{Cd}^{107})$  0.22 scin  $\beta\gamma$ , scin  
 $\beta(0.22 \gamma)$

W.A. Cassatt, Jr., W.W. Meinke, Phys. Rev. 100,  
1372 (1955).

In  $(0.172 \gamma)(0.247 \gamma)$  delay = 85  $\mu\text{s}$  2  
49 62

2.8<sup>d</sup> L.H. Rietjens, H.J. Van den Bold, A. Heyligers,  
Physica 21, 899 (1955).

$(0.172 \gamma)(0.247 \gamma)$  delay = 84.9  $\mu\text{s}$   $\begin{smallmatrix} +13 \\ -5 \end{smallmatrix}$  scin

P.C. Simms, R.M. Steffen, Bull. Am. Phys. Soc.  
1, No. 4, 207 R5 (1956).

In  $\gamma$  (0.392)  $\alpha = 0.39$  4 GM  
49 64  
1.7<sup>h</sup> Authors conclude  $\gamma$  is E5

I.V. Estulin, E.M. Moiseeva, Soviet Phys. JETP  
1, 463 (1955); Zhur. Eksptl' i Teoret. Fiz.  
28, 541 (1955).

In  $\gamma$  In  $(^{115}) (\gamma, n \gamma)$   $E_\gamma \leq 22$ ; scin  
49 65 0.312 15  $\gamma\gamma$  delay = 42  $\mu\text{s}$  5

Threshold = 9.93 10

S.H. Vegors, Jr., R.B. Duffield, Bull. Am.  
Phys. Soc. 1, No. 4, 206 R1 (1956); verbal  
report.

In  $\text{Cd}^{114}$  (20-Mev p,n);  $\text{Cd}^{114}$  (20-Mev d,2n)  
49 65  $\beta^-$  0.1% 0.675 25 a  $\beta\gamma$   
72<sup>s</sup> 97% 2.0 a  
g.s.

$\beta^+$  (0.004%) (1.3)

$\gamma(\text{Cd}^{114})$  0.556 scin

$\gamma(\text{Sn}^{114})$  1.30

No 0.572  $\gamma$ , 0.722  $\gamma$  ( $\leq 0.2\%$ ) No 1.278  $\gamma$

(0.675  $\beta$ )(1.30  $\gamma$ ) (K x ray)(0.556  $\gamma$ )

No (K x ray)(0.722, 1.30  $\gamma$ )

(K x ray)/ $\beta$  in 72<sup>s</sup> and in 50<sup>d</sup> In shows 1.7%  $\epsilon_K$

goes to  $\text{Cd}^{114}$  g.s.

L. Grodzins, H. Motz, Phys. Rev. 100, 1236A  
(1955); verbal report.

In 0.192 level  
49 65 J 5 M  
50<sup>d</sup>  $\mu$   $\pm 4.7$  5°

L.S. Goodman, S. Wexler, Phys. Rev. 100, 1245A  
(1955); \*verbal report.

$\gamma$  (0.192) In  $^{113}$  (pile n, $\gamma$ ); scin

$\gamma(\text{Cd}^{114})$  0.556  
0.722

No 0.572  $\gamma$ , 1.278  $\gamma$

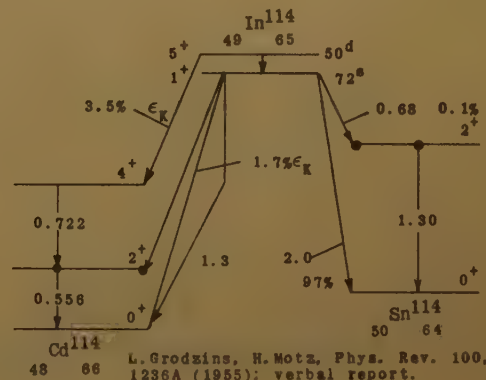
(0.556  $\gamma$ )(0.722  $\gamma$ )

No (0.556  $\gamma$ )(1.30  $\gamma$ ); 1.30  $\gamma$  assigned to 72<sup>s</sup>In

L. Grodzins, H. Motz, Phys. Rev. 100, 1236A  
(1955); verbal report.

(0.722  $\gamma$ )(0.556  $\gamma$ )( $\theta$ )  $J = 4, 2, 0$   
Influence of physical and chemical state of  
source on  $\gamma\gamma(\theta)$  not found

R.M. Steffen, L.M. Noble, Bull. Am. Phys. Soc.  
1, No. 1, 42, K5 (1956).



L. Grodzins, H. Motz, Phys. Rev. 100,  
1236A (1955); verbal report.



J.L.Olsen, L.G.Wann, M.Lindner, Bull. Am. Phys. Soc. 1, No. 1, 41, K2 (1958); \*J.M. Hollander, *ibid.*



Te <sup>126</sup> 52 74	Level	Te <sup>126</sup> ( $\alpha, \alpha'\gamma$ )	E <sub><math>\alpha</math></sub> = 6.5
	$\gamma$	0.662 $\tau = 7.0 \mu\text{s}$	scin

N.P. Heydenburg, G.M. Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

		Te <sup>126</sup> (n, n' $\gamma$ )	E <sub>n</sub> = 4.4
	0.6†	0.68 2	scin
	~0.2†	1.38 4	
No 0.74 $\gamma$ (< 0.03†)			
†Relative to 0.83 $\gamma$ from same reaction on Te <sup>130</sup>			

R.M. Sinclair, Bull. Am. Phys. Soc. 1, No. 1, 42 K3 (1956); verbal report.

Te <sup>129</sup> 52 77	$\gamma(I^{129})$	10†	0.460 10	scin
	w		0.775° 20	
	72 <sup>m</sup> g.s.	1†	1.070 20	
No $\gamma$ with 0.15 < E <sub><math>\gamma</math></sub> < 0.45				
*Assignment uncertain				

T. Stribel, Z. Naturf. 10a, 797 (1955).

Te <sup>129</sup> 52 77	$\tau$	41 <sup>d</sup>	
	33 <sup>d</sup>	$\gamma$	0.1063 1 K/L~1, $\alpha$ large

W.E. Graves, A.C.G. Mitchell, Phys. Rev. 100, 1236A (1955).

Te <sup>127</sup> 52 75	$\beta^-$	0.683 10	Te <sup>(128)</sup> ( $\gamma, n$ ) chem
	No $\gamma$		scin

M.C. Day, Jr., G.W. Eakins, A.F. Voigt, Phys. Rev. 100, 796 (1955).

Te <sup>128</sup> 52 76	Level	Te <sup>128</sup> ( $\alpha, \alpha'\gamma$ )	E <sub><math>\alpha</math></sub> = 6.5
	$\gamma$	0.750 $\tau = 4.2 \mu\text{s}$	scin

N.P. Heydenburg, G.M. Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

Level	Te <sup>130</sup> (n, n' $\gamma$ )	E <sub>n</sub> = 4.4
	$\gamma$	0.83 2 scin

R.M. Sinclair, Bull. Am. Phys. Soc. 1, No. 1, 42, K3 (1956); verbal report.

Level	Te <sup>128</sup> (n, n' $\gamma$ )	E <sub>n</sub> = 4.4
	$\gamma$ 0.7† 0.76 2	scin
†Relative to 0.83 $\gamma$ from same reaction on Te <sup>130</sup>		

R.M. Sinclair, Bull. Am. Phys. Soc. 1, No. 1, 42, K3 (1956); verbal report.

I <sup>127</sup> 53 74	ground state	
	$ \mu_3 $	0.17 3

Recalculated using data of V. Jaccarino et al.\*

C. Schwartz, Phys. Rev. 97, 380 (1955); \*V. Jaccarino et al., Phys. Rev. 94, 1798 (1954).

Te <sup>129</sup> 52 77	$\tau$	74 <sup>m</sup>	
	$\beta^-$	10% 0.29 15% 0.989	sl
72 <sup>m</sup> g.s.		4% 0.69 71% 1.453	
	$\gamma(I^{129})$	0.027 scin; sl ce, pe	
		0.212 0.725	
		0.475 1.12	

W.E. Graves, A.C.G. Mitchell, Phys. Rev. 100, 1236A (1955).

$\beta^-$	~20%	1.01 2	Te <sup>(130)</sup> ( $\gamma, n$ ) chem
	~80%	1.46 1	scin $\beta\gamma$
$\gamma(I^{129})$	~0.035	/	scin
	0.450 5		
(1.46 $\beta$ (~0.035 $\gamma$ ))		(1.01 $\beta$ (0.45 $\gamma$ ))	
(~0.035 $\gamma$ (0.45 $\gamma$ ))		No 0.485 $\gamma$	

M.C. Day, Jr., G.W. Eakins, A.F. Voigt, Phys. Rev. 100, 796 (1955).

$\gamma$	I <sup>127</sup> ( $\alpha, \alpha'\gamma$ )	scin
	0.060 2	
	0.201 4	
$\gamma$	I <sup>127</sup> (p, p' $\gamma$ )	E <sub>p</sub> = 3.2 scin
	0.208 7	B(E2) = 0.044 ( $\alpha$ = 0.14)
	0.392° 8	
	0.438 10	B(E2) = 0.0061
	0.631 10	= 0.116
	0.751 25	= 0.074
	0.94° 5	

\*Yield as f(E<sub>p</sub>) incompatible with E2 excitation

A.S. Divatia, R.H. Davis, R.D. Moffat, D.A. Lind, Phys. Rev. 100, 1266A (1955); verbal report.

I <sup>128</sup> 53 75	$\beta^-$	~1.6	scin $\beta\gamma$
		~2.0	scin
25 <sup>m</sup>	$\gamma(\text{Xe}^{128})$	0.428	
	(~1.6 $\beta$ ) (0.428 $\gamma$ )		

T. Stribel, Z. Naturf. 10a, 797 (1955).



$I^{128}_{53\ 75}$	$\gamma(Xe^{128})^*$	$I^{127}(n,\gamma)$ chem; scin
$25^m$	100† 0.440 5	
	<1.5† 0.520	
	3† 0.960 15	

$\gamma(Te^{128})^*$   
~0.5† 0.750

\*Assignment from energy systematics of  $2^+$  states

R.K. Gupta, S. Jha, Nuclear Phys. 1, 2 (1956).

$I^{128}_{53\ 75}$	Capture $\gamma$ 's	$I^{127}(th\ n,\gamma)$	
	st ~0.085	scin Cp	
	w 0.255		

Study covered  $E_\gamma = 0.1$  to 2.5

M. Reier, M.H. Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).

$Xe^{130}_{54\ 76}$	Level	$Xe^{(130)}(\alpha, \alpha'\gamma)$	$E_\alpha = 6.5$
	$\gamma$	0.530	scin

N.P. Heydenburg, G.M. Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$Xe^{131}_{54\ 77}$	Charges 1 to 21 (av. = 8.0) found on recoils
$12^d$	Charge distribution given s $Xe^{131}$ recoil

A.H. Snell, F. Pleasonton, Bull. Am. Phys. Soc. 1, No. 1, 42, K6 (1956); verbal report.

$Xe^{131}_{54\ 77}$	$\gamma$	$Xe^{(131)}(\alpha, \alpha'\gamma)$	$E_\alpha = 6.5$
		0.286	scin
		0.364	

N.P. Heydenburg, G.M. Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956).

$Xe^{132}_{54\ 78}$	Level	$Xe^{(132)}(\alpha, \alpha'\gamma)$	$E_\alpha = 6.5$
	$\gamma$	0.670	scin

N.P. Heydenburg, G.M. Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$Xe^{134}_{54\ 80}$	Level	$Xe^{(134)}(\alpha, \alpha'\gamma)$	$E_\alpha = 6.5$
	$\gamma$	0.870	scin

N.P. Heydenburg, G.M. Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$Cs^{128}_{55\ 73}$	$\tau$	$2.5^m$ f	$La(480-Mev\ p)$ chem
$3.8^m$	$\beta^+$	2.9	
	d $Ba^{128}$		

A.M. Murin, B.K. Preobrazhensky, I.A. Yutlandov, M.A. Yakimov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 160 July (1955); Consultants Bureau Trans. p. 101.

$Cs^{129}_{55\ 74}$	$\gamma(Xe^{129})$	$Cs^{133}(80-Mev\ p, p4n)$ chem
$31^h$		scin
		0.395 10
		0.55 3

B.L. Robinson, R.W. Fink, Phys. Rev. 98, 221, 231A (1955).

$Cs^{131}_{55\ 76}$	Continuous $\gamma$ spectrum in coincidence with $M\ x$ rays has shape predicted by Morrison and Schiff for $E_\gamma > 0.05$
$10^d$	

A. Michalowicz, Compt. Rend. 242, 108 (1956).

$Cs^{134}_{55\ 79}$	$\beta^-$	28%	0.080 3		sl
$2.3^y$		3%	0.210 10	56%	0.650 5
$g.s.$		5%	0.409 44	8%	0.685 10

$\gamma(Ba^{134})$	10†	0.204 5	sl ce, pe
	4†	0.475 3	72† 0.796 1
	14†	0.562 2	11† 0.802 1
	12†	0.569 1	5† 1.035 3
	100†	0.604 1	3† 1.167 3
	w	0.658 3*	5† 1.369 3

\*Due to  $Cs^{137}$  impurity?

H.H. Forster, J.S. Wiggins, Nuovo Cim. 2, 854 (1955).

(1.367  $\gamma$ )(0.605  $\gamma$ )( $\theta$ )  $J=3$ (or 4 or 2), 2, 0

E.D. Klema, Phys. Rev. 100, 66 (1955).

$Cs^{137}_{55\ 82}$	$\tau$	$30.0^{y+3}_{-4}$	specific activity;
$27^y$			$4\pi$ ic, ms

F. Brown, G.R. Hall, A.J. Walter, J. Inorg. Nuclear Chem. 1, 241 (1955).

$Cs^{138}_{55\ 83}$	$\gamma(Ba^{138})$	$U^{(235)}(th\ n, f)$	chem			
$33^m$						
	2%	0.1389	M1*	4%	0.87	scin,
	1%	0.1931		25%	1.010	s $\pi$ ce
	2%	0.2289		73%	1.426	
	3%	0.4106		18%	2.21	
	26%	0.4626		9%	2.63	
	8%	0.5495		0.5%	3.34	

(1.426  $\gamma$ )(0.139, 0.411, 0.463, 0.550, 0.87  $\gamma$ , 1.010  $\gamma$ ) No (1.426  $\gamma$ )(2.21, 2.63  $\gamma$ )  
(0.229  $\gamma$ )(2.21  $\gamma$ ) No (0.229  $\gamma$ )(2.63  $\gamma$ )  
(0.463  $\gamma$ )(0.139, 0.411, 0.550  $\gamma$ )  
No (0.463  $\gamma$ )(1.010  $\gamma$ ) (0.139  $\gamma$ )(0.87  $\gamma$ )  
(1.010  $\gamma$ )(1.426  $\gamma$ )( $\theta$ )  $J=3, 2, 0$

\*M1 assignment based on  $\alpha$   
R.B. Duffield, M.E. Sunker, J.P. Mize, J.W. Starnes, Phys. Rev. 100, 1236A (1955); verbal report.

$\text{Ba}^{131}$   
56 75  
13<sup>d</sup>  $\text{Ba}^{(130)}$  (pile n, $\gamma$ ) chem  
(0.495 $\gamma$ )(0.122 $\gamma$ ) delay = 4.0 $\mu$ s<sub>3</sub>  
H. Vartapétian, L. Dick, R. Foucher, N. Perrin,  
Compt. rend. 242, 103 (1956).

(0.495 $\gamma$ )(0.122 $\gamma$ ) delay = 4.1 $\mu$ s<sub>5</sub>

C. F. Coleman, Phil. Mag. 96, 1135 (1955).

$\text{Ba}^{137}$   
56 81 Levels  $\text{Ba}^{(137)}$  (n,n' $\gamma$ ) 2.6 $\mu$   $\text{Ba}^{137}$   
0.66  $E_n = 0.5$  to 3  
1.05 2.25 ?<sup>\*</sup>  
1.78 2.38

\*Does not feed IT state, other levels do

C. P. Swann, F. R. Metzger, Phys. Rev. 100, 1329 (1955).

$\text{Ba}^{139}$   
56 83 Levels  $\text{Ba}^{(138)}$  (d,p)  $E_d = 7.0, 7.5$   
1 $\uparrow$  g.s.  $Q = 2.493$  10 s 90°  
1.5 $\uparrow$  0.623 s  
†Relative intensity for  $E_d = 7.0$

C. H. Paris, W. W. Buechner, P. M. Endt, Phys. Rev. 100, 1317 (1955).

$\text{La}^{137}$   
57 80  $\tau > 10^5$  y d 8.7<sup>h</sup> Ce  
From absence of Ba K, L x rays crit a, pc

A. R. Brosi, B. H. Ketelle, Phys. Rev. 100, 169 (1955).

$\text{La}^{139}$   
57 82 q ground state +0.6 2 S

K. Murakawa, J. Phys. Soc. Japan 10, 927 (1955); Phys. Rev. 98, 1285 (1955).

$\text{La}^{(139)}$  ( $\alpha, \alpha'\gamma$ )  $E_\alpha = 6$ ; scin  
No  $\gamma$  with  $E_\gamma < 0.6$ ; 0.166 level not E2 excited

N. P. Heydenburg, G. M. Temmer, Phys. Rev. 100, 150 (1955).

Ce  
58 No  $\gamma$  with  $E_\gamma < 0.6$   $E_\alpha = 6$ ; scin

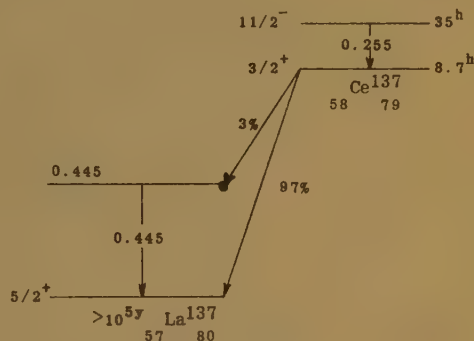
N. P. Heydenburg, G. M. Temmer, Phys. Rev. 100, 150 (1955).

$\text{Ce}^{134}$   
58 76  $\tau$  66<sup>h</sup> U(480-Mev p) chem  
72<sup>h</sup> A. P. Vinogradov, I. P. Alimarin, V. I. Baranov, A. K. Lavrukhina, T. V. Baranova, F. I. Pavlotskaya, A. A. Bragina, Y. V. Yakovlev, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 97 July (1955); Consultants Bureau Trans. p. 65.

$\text{Ce}^{137}$   
58 79  $\tau$  8.7<sup>h</sup>  $\text{Ce}^{136}$  (slow n, $\gamma$ ) chem  
8.7<sup>h</sup>  $\epsilon$  100% (La K x ray)/ $\gamma$  crit a, pc  
g.s.  $\gamma(\text{La}^{137})$  3% 0.445  $\alpha_K \sim 0.02$   
(0.445 $\gamma$ )(La K x ray) crit a, pc  
d 35<sup>h</sup>  $\text{Ce}^{137}$

A. R. Brosi, B. H. Ketelle, Phys. Rev. 100, 169 (1955).

$\text{Ce}^{137}$   
58 79  $\tau$  Ba(48-Mev  $\alpha$ ) chem;  $\text{Ce}^{136}$  (pile n, $\gamma$ )  
35<sup>h</sup> 34.5<sup>h</sup> 5  
 $\gamma$  0.255  $\alpha_K = 5.5 \pm 1.5$  sl ce, scin  
K/L = 2.3  $\pm$  0.2 M4 sl ce  
x Ce K x ray crit a, pc  
p 8.7<sup>h</sup>  $\text{Ce}^{137}$



A. R. Brosi, B. H. Ketelle, Phys. Rev. 100, 169 (1955).

$\text{Ce}^{139}$   
58 81  $\gamma(\text{La}^{139})$  (0.166) E2/M1  $\sim 0.04$   $\gamma(\theta, T)$   
140<sup>d</sup>  $\gamma(\theta, T)$  consistent with  $J = 3/2 \pm 5/2 \pm 7/2$

E. Ambler, R. P. Hudson, G. M. Temmer, Phys. Rev. 101, 196 (1956).

$\text{Ce}^{141}$   
58 83  $\gamma(\text{Pr}^{141})$   $\text{Ce}^{(140)}$  (pile n, $\gamma$ )  
33<sup>d</sup> (0.145) E2/M1 = 0.007 3  
 $\gamma(\theta, T)$  and  $\gamma(L, T)$  studied for aligned Ce

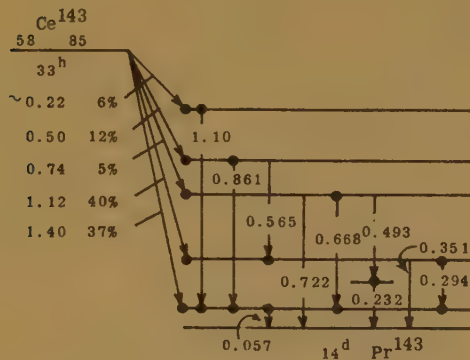
C. F. M. Cacho, M. A. Grace, C. E. Johnson, A. C. Knipper, R. G. Scurlock, R. T. Taylor, Phil. Mag. 46, 1287 (1955).

$\text{Ce}^{143}$   
58 85  $\tau$  33.4<sup>h</sup>  $\text{Ce}^{142}$  (n, $\gamma$ )  
33<sup>h</sup>  $\beta^-$  6%  $\sim 0.22$  sd; scin  $\beta$  (1.10  $\gamma$ )  
12% 0.50 3 sd; scin  $\beta$  (0.86  $\gamma$ )  
5% 0.74 15 sd; scin  $\beta$  (0.67  $\gamma$ )  
40% 1.125 15 sd; scin  $\beta$  (0.29  $\gamma$ )  
37% 1.40 2 sd; scin  $\beta$  (0.06  $\gamma$ )

$\gamma(\text{Pr}^{143})$  0.0574 2  $\alpha_K = 5.9$  M1<sup>\*</sup> s $\pi$  ce,  
0.232 1 scin  
0.294 1 0.668 2  
0.351 1 0.722 2  
0.493 2 0.861 5  
0.565 5<sup>\*\*</sup> 1.10 1<sup>†</sup>

Continued

$\text{Ce}^{143}$   
 $58 \quad 85$   
 $33^h$   
 (0.057 $\gamma$ )(0.294, 0.668, 0.861, 1.10 $\gamma$ )  
 (0.232 $\gamma$ )(0.493 $\gamma$ ) (0.294 $\gamma$ )(0.565 $\gamma$ )  
 No other  $\gamma\gamma$  coincidences observed  
 No 1.46 $\beta$  (<2%) scin $\beta, \beta\gamma$   
 No 0.126, 0.160 $\gamma$   
 $L_{\alpha 2}$  ce not observed  
 Observed only in (0.294 $\gamma$ )  $\gamma$  spectrum scin  
 $\delta$  ce not observed



D.W.Martin, M.K.Brice, J.M.Cork, S.B.Burson,  
 Phys. Rev. 101, 182 (1956).

$\text{Pr}^{141}$   
 $59 \quad 82$   
 J 5/2 para  
 $|\mu|$  3.9 2

J.M.Baker, B.Bleaney, Proc. Phys. Soc. 68A,  
 936 (1955).

$\text{Pr}^{141}(\alpha, \alpha'\gamma)$   $E_a = 6$ ; scin  
 No  $\gamma$  with  $E_\gamma < 0.6$ ; 0.145 level not E2 excited  
 N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100,  
 150 (1955).

$\text{Pr}^{143}$   $\tau$  13.95<sup>d</sup>  $\text{Ce}^{142}(n, \gamma\beta)$   
 $59 \quad 84$   $\beta^-$  0.93 1 sd  
 $14^d$

D.W.Martin, M.K.Brice, J.M.Cork, S.B.Burson,  
 Phys. Rev. 101, 182 (1956).

$\text{Nd}^{143}$   $\text{Nd}^{143}(\alpha, \alpha'\gamma)$   $E_a = 6$ ; scin  
 $60 \quad 83$  No  $\gamma$  with  $E_\gamma < 0.6$   
 N. P. Heydenburg, G.M.Temmer, Phys. Rev. 100,  
 150; 98, 1198A (1955).

$\text{Nd}^{145}$   $\gamma$   $\text{Nd}^{145}(\alpha, \alpha'\gamma)$   $E_a = 6$ ; scin  
 $60 \quad 85$  0.070 1  $\epsilon B(E2) \sim 0.03$   
 N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100,  
 150; 98, 1198A (1955).

$\text{Nd}^{146}$  Level  $\text{Nd}^{146}(\alpha, \alpha'\gamma)$   $E_a = 6$ ; scin  
 $60 \quad 86$   $\gamma$  0.455 5  $\epsilon B(E2) = 0.84$   
 N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100,  
 150; 98, 1198A (1955).

$\text{Nd}^{147}$  ground state  
 $60 \quad 87$  J 9/2  $\gamma(\theta, T)$   
 $|\mu|$  0.22 5  
 $\gamma(\text{Pm}^{147})$  (0.092)  $E2/M1 \sim 0.03$   $\gamma(\theta, T)$   
 (0.530)  $E2 = 100\%$   
 $\gamma(\theta, T)$  shows  $J = 9/2 - \beta - 9/2 - (0.530\gamma) \rightarrow 5/2$

E.Ambler, R.P.Hudson, G.M.Temmer, Phys. Rev.  
 101, 196 (1956); 97, 1212; 98, 230A (1955).

$\text{Nd}^{148}$  Level  $\text{Nd}^{148}(\alpha, \alpha'\gamma)$   $E_a = 6$ ; scin  
 $60 \quad 88$   $\gamma$  0.300 3  $\epsilon B(E2) = 1.50$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100,  
 150; 98, 1198A (1955).

$\text{Nd}^{150}$  Level  $\text{Nd}^{150}(\alpha, \alpha'\gamma)$   $E_a = 6$ ; scin  
 $60 \quad 88$   $\gamma$  0.128 1  $\epsilon B(E2) = 1.24$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100,  
 150; 98, 1198A (1955).

$\text{Sm}^{143}$   $\tau$  8.3<sup>m</sup> 3  $\text{Sm}^{(144)}(\leq 30\text{-Mev } n, 2n)$   
 $62 \quad 81$   $\beta^+$  2.3 3 a  
 $8^m$  No  $\gamma$  with  $E_\gamma > 0.15$  scin

M.Mirnik, A.H.W.Aten, Jr., Physica 22, 14  
 (1956).

$\text{Sm}^{147}$   $\text{Sm}^{147}(\alpha, \alpha'\gamma)$   $E_a = 6$ ; scin  
 $62 \quad 85$  No  $\gamma$  with  $E_\gamma < 0.6$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100,  
 150; 98, 1198A (1955).

$\text{Sm}^{148}$  Level  $\text{Sm}^{148}(\alpha, \alpha'\gamma)$   $E_a = 6$ ; scin  
 $62 \quad 86$   $\gamma$  0.562 6  $\epsilon B(E2) = 2.06$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100,  
 150; 98, 1198A (1955).

Level  $\text{Sm}^{148}(p, p'\gamma)$   $E_p = 2.9$ ; scin  
 $\gamma$  0.55 5  $\epsilon B(E2) = 0.74$

H.Mark, G.T.Paulissen, Phys. Rev. 100, 813  
 (1955).

Level  $\text{Sm}^{148}(p, p'\gamma)$   $E_p = 3.29$ ; scin  
 $\gamma$  0.562 8

B.E.Simmons, K.F.Famularo, G.D.Freier, Phys.  
 Rev. 100, 1265A (1955).

$\text{Sm}^{149}$   $\text{Sm}^{149}(\alpha, \alpha'\gamma)$   $E_a = 6$ ; scin  
 $62 \quad 87$  No  $\gamma$  with  $E_\gamma < 0.6$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100,  
 150; 98, 1198A (1955).

$\text{Sm}^{150}$  Level  $\text{Sm}^{150}(\alpha, \alpha'\gamma)$   $E_a = 6$ ; scin  
 $62 \quad 88$   $\gamma$  0.337 3  $\epsilon B(E2) = 2.32$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100,  
 150; 98, 1198A (1955).



$^{150}_{88}\text{Sm}$  Level  $^{150}_{88}\text{Sm}(p,p'\gamma)$   $E_p = 2.9$ ; scin  
 $\gamma$  0.335 17  $\epsilon B(E2) = 0.51$

H. Mark, G.T. Paulissen, Phys. Rev. 100, 813 (1955).

Level  $^{150}_{88}\text{Sm}(p,p'\gamma)$   $E_p = 2.61$ ; scin  
 $\gamma$  0.337 3  $p,\gamma(\theta)$  studied

B.E. Simmons, K.F. Famularo, G.D. Freier, Phys. Rev. 100, 1265A (1955).

Capture  $\gamma$ 's  $^{149}\text{Sm}(\text{th } n,\gamma)$   $s\pi$  Cp  
 38† 0.33 1  $\sim 4.15$  10  
 33† 0.44 1  $\sim 4.25$  10  
 12† 0.60 1  $\sim 4.40$  10  
 7† 0.67 2  $\sim 4.50$  10  
 19† 0.76 1  $> 0.15$ † 4.65 10  
 0.90 3 4.8 1  
 0.95 3 5.0 1  
 3† 1.07 2  $> 0.5$ † 5.60 5  
 7† 1.20 2  $\sim 5.9$  1  
 $> 2$ † 1.27 3  $> 0.3$ † 6.00 5  
 $> 5$ † 1.35 2  $\sim 0.35$ † 6.54 10  
 $\sim 1.50$  5  $\sim 0.06$ † 6.80 5  
 $\sim 1.60$  5 0.7† 7.22 3

Level scheme implies  $B_n = 8.00$  3

Levels proposed at 0.33, 0.77, 1.20, 1.43, 1.54, 2.00, 2.30, 3.35

Lines between 1.60 and 4.15 not resolved

†Photons/100 Sm captures

B.P. Adyasevich, B.D. Groshev, A.M. Demidov, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 270 July (1955); Consultants Bureau Trans. p. 195.

$^{152}_{90}\text{Sm}$  Level  $^{152}_{90}\text{Sm}(\alpha,\alpha'\gamma)$   $E_\alpha = 6$ ; scin  
 $\gamma$  0.122 1  $\epsilon B(E2) = 1.36$

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Level  $^{152}_{90}\text{Sm}(p,p'\gamma)$   $E_p = 2.9$ ; scin  
 $\gamma$  0.125 6  $\epsilon B(E2) = 0.43$

H. Mark, G.T. Paulissen, Phys. Rev. 100, 813 (1955).

Level  $^{152}_{90}\text{Sm}(p,p'\gamma)$   $E_p = 2.28$ ; scin  
 $\gamma$  0.124 2  $p,\gamma(\theta)$  studied

B.E. Simmons, K.F. Famularo, G.D. Freier, Phys. Rev. 100, 1265A (1955).

$^{153}_{91}\text{Sm}$   $\beta^-$  0.06% 0.130 32% 0.720 scin  
 41% 0.643 27% 0.825  
 $\gamma(^{153}\text{Eu})$   
 680° 0.070 scin  
 1000° 0.100 0.65° 0.530  
 0.45° 0.170 0.15° 0.600

Continued

$^{153}_{91}\text{Sm}$  (0.53  $\gamma$ )(0.07, 0.10  $\gamma$ ) (0.10  $\gamma$ )(0.07, 0.60  $\gamma$ )  
 No (0.60  $\gamma$ )(0.07  $\gamma$ )  
 47h \*Estimated relative transition probabilities

V.S. Dubey, C.E. Mandeville, N.A. Rothman, Bull. Am. Phys. Soc. 1, No. 4, 164 B12 (1956); verbal report.

$^{154}_{92}\text{Sm}$  Level  $^{154}_{92}\text{Sm}(\alpha,\alpha'\gamma)$   $E_\alpha = 6$ ; scin  
 $\gamma$  0.082 1  $\epsilon B(E2) = 0.48$

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Level  $^{154}_{92}\text{Sm}(p,p'\gamma)$   $E_p = 2.9$ ; scin  
 $\gamma$  0.084 4  $\epsilon B(E2) = 0.27$

H. Mark, G.T. Paulissen, Phys. Rev. 100, 813 (1955).

Level  $^{154}_{92}\text{Sm}(p,p'\gamma)$   $E_p = 2.07$ ; scin  
 $\gamma$  0.085 3  $p,\gamma(\theta)$  studied

B.E. Simmons, K.F. Famularo, G.D. Freier, Phys. Rev. 100, 1265A (1955).

$^{151}_{88}\text{Eu}$  Levels  $^{151}_{88}\text{Eu}(\alpha,\alpha'\gamma)$   $E_\alpha = 6.5$  scin  
 0.195 level  
 $\gamma$  0.195  $\epsilon B(E2) = 0.067$   
 0.304 level  
 $\gamma$  0.110  $\epsilon B(E2) = 0.024$   
 0.195  
 0.304  $\epsilon B(E2) = 0.22$

N.P. Heydenburg, G.M. Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$\gamma$   $^{151}_{88}\text{Eu}(p,p'\gamma)$   $E_p = 2.9$ ; scin  
 0.300 15

H. Mark, G.T. Paulissen, Phys. Rev. 100, 813 (1955).

$^{152}_{89}\text{Eu}$   $\beta^-$  2% 1.000 sl  
 13% 1.460  
 $\gamma(^{152}\text{Sm})$   
 59% 0.122 sl  $\alpha$ , scin  
 9% 0.244 14% 0.963  
 5% 0.442 13% 1.085  
 0.5% 0.550 12% 1.110  
 1% 0.720 2% 1.210  
 6% 0.866 25% 1.405  
 $\gamma(^{152}\text{Gd})$   
 27% 0.344 9% 0.778  
 2.5% 0.408 1.5% 1.100  
 0.3% 0.690 2% 1.240

(0.122  $\gamma$ )(0.963, 1.110, 1.405  $\gamma$ )

(0.244  $\gamma$ )(0.866, 1.210  $\gamma$ )

(0.442  $\gamma$ )(0.963, 1.085  $\gamma$ )

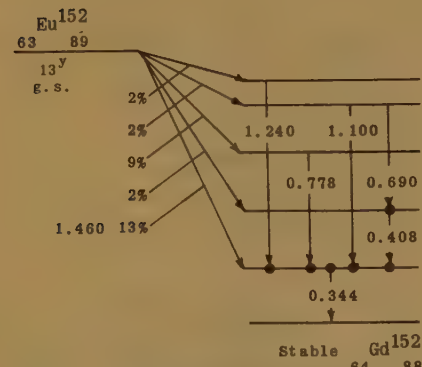
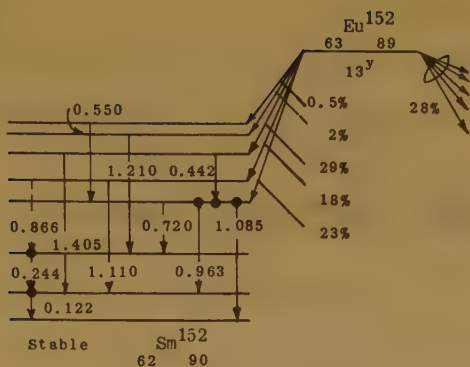
(0.344  $\gamma$ )(0.778, 1.100, 1.240  $\gamma$ )

(0.408  $\gamma$ )(0.344, 0.690  $\gamma$ )

(1.00  $\beta$ )(0.408  $\gamma$ ) (1.46  $\beta$ )(0.344  $\gamma$ ) scin

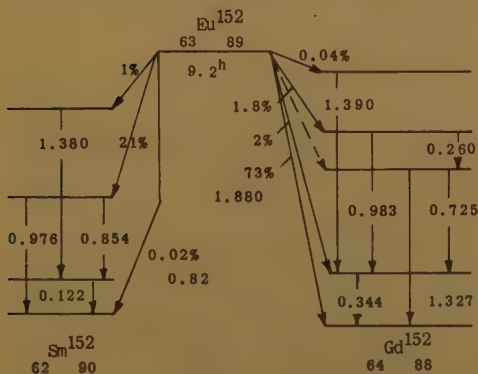
Continued

$^{152}_{63}\text{Eu}$   
89  
13<sup>y</sup>  
g.s.



L.Grodzins, H.Kendall, Bull. Am. Phys. Soc.1, No.4, 163 B10, 164 B11 (1956); verbal report.

$^{152}_{63}\text{Eu}$	$\beta^+$	0.82 10		scin
89				
9.2 <sup>h</sup>	$\beta^-$	1.880		sl
	$\gamma(\text{Sm}^{152})$			sl ce, scin
	15.2%	0.122	6.7%	0.976
	14.2%	0.854	1.0%	1.380
	$\gamma(\text{Gd}^{152})$			
	0.1%	0.260	0.5%	0.983
	2.7%	0.344	1.2%	1.327
	0.1%	0.725	0.04%	1.390



L.Grodzins, H.Kendall, Bull. Am. Phys. Soc.1, No.4 163 B10, 164 B11 (1956); verbal report.

$^{153}_{63}\text{Eu}$	Levels	$^{153}\text{Eu}(\alpha, \alpha'\gamma)$	$E_a = 6.5$ scin
90		0.082 level	
	$\gamma$	0.082	$\epsilon B(E2) = 0.60$
		0.187 level	
	$\gamma$	0.082	
		0.105	$\epsilon B(E2) = 0.18$
		0.187	= 0.29

N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

Levels	$^{153}\text{Eu}(\text{p}, \text{p}'\gamma)$	$E_p = 2.9$ ; scin
	0.085 level	
$\gamma$	0.085 4	$\epsilon B(E2) = 0.20$
	0.200 level	
$\gamma$	0.085 4	
	0.115 6	
	0.200 10	$\epsilon B(E2) = 0.14$

H.Mark, G.T.Paulissen, Phys. Rev. 100, 813 (1955).

$^{155}_{63}\text{Eu}$	$\beta^-$	79%	0.150 10	scin
92		21%	0.240 10	
1.7 <sup>y</sup>	$\gamma(\text{Gd}^{155})$		0.018	scin
			0.084	
			0.102	
	No (0.24 $\beta$ ) $\gamma$			

V.S.Dubey, C.E.Mandeville, M.A.Rothman, Bull. Am. Phys. Soc. 1, No. 4, 164 B12 (1956); verbal report.

$^{153}_{64}\text{Gd}$	$\gamma(\text{Eu}^{153})$	(0.103)	$\alpha = 1.2$	$\Sigma$ scin
89				
236 <sup>d</sup>	No $\epsilon$ to g.s.	(<10%)		$\Sigma$ scin

S.G.Cohen, Y.Burde, S.Ofer, Bull. Research Council Israel 5A, 87A (1955).

$^{154}_{64}\text{Gd}$	Level	$^{154}\text{Gd}(\alpha, \alpha'\gamma)$	$E_a = 6$ ; scin
90			
	$\gamma$	0.123 1	$\epsilon B(E2) = 2.10$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955); verbal report.

Level	$^{154}\text{Gd}(\text{p}, \text{p}'\gamma)$	$E_p = 1.9$ ; scin
$\gamma$	0.123*6	$\epsilon B(E2) = 1.0$
	Composite $\gamma$	

H.Mark, G.T.Paulissen, Phys. Rev. 100, 813 (1955).

$^{155}_{64}\text{Gd}$	ground state		
91			
J	3/2 <sup>+</sup>		enriched Gd <sup>155</sup> ; S
$\mu$	-0.31		

\*Value consistent with theory for deformed nuclei<sup>6</sup>, not with shell model prediction

F.A.Jenkins, D.R.Speck, Phys. Rev. 100, 973A (1955); S.B.R.Mottelson, S.G.Nilsson, Phys. Rev. 99, 1615 (1955).

$Gd^{155}$   $\gamma$   $Gd^{155}(\alpha, \alpha' \gamma)$   $E_{\alpha} = 6$ ; scin  
 64 91 **0.145 1**  $\epsilon B(E2) = 0.112^*$   
 \*Assuming this  $\gamma$  is from a postulated 2<sup>nd</sup> excited state at 0.21

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

$\gamma$   $Gd^{155}(p, p' \gamma)$   $E_p = 2.9$ ; scin  
**0.140 14**

H. Mark, G.T. Paulissen, Phys. Rev. 100, 813 (1955).

$Gd^{156}$  Level  $Gd^{156}(\alpha, \alpha' \gamma)$   $E_{\alpha} = 6$ ; scin  
 64 92  $\gamma$  **0.089 1**  $\epsilon B(E2) = 1.24$

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Level  $Gd^{156}(p, p' \gamma)$   $E_p = 1.9$ ; scin  
 $\gamma$  **0.089 5**  $\epsilon B(E2) = 0.74$

H. Mark, G.T. Paulissen, Phys. Rev. 100, 813 (1955).

$Gd^{157}$  ground state  
 64 93 J **3/2\*** enriched  $Gd^{157}$ ; S  
 $\mu$  **-0.38**

\*Value consistent with theory for deformed nuclei<sup>§</sup>, not with shell model prediction

F.A. Jenkins, D.R. Speck, Phys. Rev. 100, 973A (1955); B.R. Mottelson, S.G. Nilsson, Phys. Rev. 99, 1615 (1955).

$\gamma$   $Gd^{157}(\alpha, \alpha' \gamma)$   $E_{\alpha} = 6$ ; scin  
**0.131 1**  $\epsilon B(E2) = 0.083^*$

\*Assuming this  $\gamma$  is from a postulated 2<sup>nd</sup> excited state at 0.19

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

$\gamma$   $Gd^{157}(p, p' \gamma)$   $E_p = 2.9$ ; scin  
**0.127 13**

H. Mark, G.T. Paulissen, Phys. Rev. 100, 813 (1955).

$Gd^{158}$  Level  $Gd^{158}(\alpha, \alpha' \gamma)$   $E_{\alpha} = 6$ ; scin  
 64 94  $\gamma$  **0.079 1**  $\epsilon B(E2) = 1.02$

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955); verbal report.

Level  $Gd^{158}(p, p' \gamma)$   $E_p = 1.9$ ; scin  
 $\gamma$  **0.080 4**  $\epsilon B(E2) = 0.63$

H. Mark, G.T. Paulissen, Phys. Rev. 100, 813 (1955).

$Gd^{160}$  Level  $Gd^{160}(\alpha, \alpha' \gamma)$   $E_{\alpha} = 6$ ; scin  
 64 96  $\gamma$  **0.076 1**  $\epsilon B(E2) \sim 1$

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150 (1955).

Level  $Gd^{160}(p, p' \gamma)$   $E_p = 1.9$ ; scin  
 $\gamma$  **0.076 4**  $\epsilon B(E2) = 0.73$

H. Mark, G.T. Paulissen, Phys. Rev. 100, 813 (1955).

$Tb^{158?}$   $\tau$  **11<sup>S</sup>**  $Tb^{159}(\gamma)$   
 65 93 x **Tb K x ray** scin  
 11

M.G. Stewart, A.J. Bureau, C.L. Hammer, Bull. Am. Phys. Soc. 1, No. 4, 206 R2 (1956); verbal report.

$Tb^{159}$  Level  $Tb^{159}(\alpha, \alpha' \gamma)$   $E_{\alpha} = 6$ ; scin  
 65 98 **0.136 level**

$\gamma$  **3.3† 0.079 1**  $\epsilon B(E2) = 0.19$   
**1† 0.136 1** = 0.041

Yields show that both  $\gamma$ 's are from 0.136 level

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955); Bull. Am. Phys. Soc. 1, No. 1, 43, K11 (1956); verbal report.

$\gamma$   $Tb^{159}(p, p' \gamma)$   $E_p = 2.9$ ; scin  
**0.077 4**

Also observed 0.17  $\gamma$ ; Er or Dy impurity?

H. Mark, G.T. Paulissen, Phys. Rev. 100, 813 (1955).

Dy Levels  $Dy(\alpha, \alpha' \gamma)$   $E_{\alpha} = 6$ ; scin  
 66  $\gamma$  **0.076 1**  $\epsilon B(E2) = 0.23^*$   
**0.166 2** = 0.29<sup>§</sup>

\*Assuming  $\gamma$  due to A = 161, 162, 163 and 164

§Assuming  $\gamma$  due to A = 161 and 163

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150 (1955).

$Dy^{165}$   $\gamma(Ho^{165})$  **(0.095)** M1 scin  
 66 99  $a_K = 2.9 3$  K x ray/ $\gamma$   
 2.3<sup>h</sup>  
 E. S. T. Stribel, Z. Naturf. 10a, 894 (1955).

$Ho^{163?}$   $\tau$  **~1<sup>S</sup>**  $Ho^{165}(\geq 16.3\text{-Mev } \gamma)$   
 67 96  $\gamma$  **0.305** scin  
 ~1<sup>S</sup>

M.G. Stewart, A.J. Bureau, C.L. Hammer, Bull. Am. Phys. Soc. 1, No. 4, 206 R2 (1956); verbal report.



Ho <sup>165</sup>		ground state	
67	98	J	7/2
		$ \mu $	3.29 17
		$ q $	~2

para

J.M.Baker, B.Bleaney, Proc. Phys. Soc. 68A, 1090 (1955).

Level	Ho <sup>165</sup> ( $\alpha, \alpha'\gamma$ )	E <sub>a</sub> = 6
	0.206 level	
$\gamma$	100† 0.112	scin
	21† 0.206	

G.M.Temmer, N.P.Heydenburg, Bull. Am. Phys. Soc. 1, No. 1, 43, K11 (1956); verbal report.

Levels	Ho <sup>165</sup> ( $\alpha, \alpha'\gamma$ )	E <sub>a</sub> = 6; scin
$\gamma$	0.094 1	$\epsilon B(E2) = 0.54$
	0.206 2	= 0.036

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955).

Er		Levels		Er ( $\alpha, \alpha'\gamma$ )		E <sub>a</sub> = 6; scin	
68		$\gamma$		0.079 1		$\epsilon B(E2) = 0.48^*$	
				0.172 2		= 0.081 <sup>§</sup>	

\*Assuming  $\gamma$  due to all stable Er isotopes

§Assuming  $\gamma$  due to A=167

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955).

Er <sup>167</sup>		$\tau$		Er( $\gamma$ )	
68	99	$\gamma$	2.5 <sup>S</sup>	0.210	scin

M.G.Stewart, A.J.Bureau, C.L.Hammer, Bull. Am. Phys. Soc. 1, No. 4, 206 R2 (1956); verbal report.

$\tau$	2.5 <sup>S</sup>	Er (pile n)
$\gamma$	0.210 10	$\alpha_K = 0.55$ 10 E3 scin

E.C.Campbell, J.H.Kahn, M.Goodrich, ORNL-1164 (1951).

Tm <sup>169</sup>		ground state	
69	100	J	1/2
		$\mu$	-0.205 20

S

$\mu$  agrees very well with the predictions of the collective model of the nucleus\*

K.H.Lindenberger, Z. Phys. 141, 476 (1955); Naturwiss. 42, 41 (1955). \*B.R.Mottelson, S.G.Nilsson, Z. Phys. 141, 217 (1955).

Level	Tm <sup>169</sup> ( $\alpha, \alpha'\gamma$ )	E <sub>a</sub> = 6; scin
	0.120 level	
$\gamma$	0.109 1	$\epsilon B(E2) = 1.12^*$

\*Assuming cascade transition from 0.120 level

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955).

Tm <sup>170</sup>		$\gamma$ (Yb <sup>170</sup> )		0.08426 2		cryst	
69	101	$\gamma$					

127<sup>d</sup>

E.N.Hatch, F.Boehm, J.W.M.DuMond, priv. comm. (1955).

Yb		Levels		Yb ( $\alpha, \alpha'\gamma$ )		E <sub>a</sub> = 6; scin	
70		$\gamma$		0.078 1		$\epsilon B(E2) = 0.28^*$	
				0.110 1		= 0.20 <sup>§</sup>	
				0.180 2		= 0.086++	

\*Assuming  $\gamma$  due to A=170 172, 173, 174, 176

§Assuming  $\gamma$  due to A=171

++Assuming  $\gamma$  due to A=173

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955).

Yb <sup>169</sup>		$\tau$		30.6 <sup>d</sup> 2		Yb <sup>(168)</sup> (pile n, $\gamma$ )	
70	99	$\gamma$	31 <sup>d</sup>	0.0084			s $\pi$ c $\epsilon$

K : L<sub>1</sub> : L<sub>2</sub> : L<sub>3</sub>  
100 : 43 : 55

210 : 100 : 18 : 10

360 : 100 : 19 : 6

9 : 10 E2

14 : 10 : 9 E2

56 : 10

66 : 10

35 : 10 E2

(~0.115  $\gamma$ )(~0.115; ~0.190, 0.261  $\gamma$ ) scin

(0.177  $\gamma$ )(0.130  $\gamma$ ) (0.261  $\gamma$ )(~0.115  $\gamma$ )

(K x ray?)(0.308  $\gamma$ )

\*Only  $\epsilon_{L1}$  observed .M1

J.M.Cork, M.K.Brice, D.W.Martin, L.C.Schmid, R.G.Helmer, Phys. Rev. 100, 1237A (1955); verbal report.

Yb <sup>169</sup>		$\tau$		0.00842		sl ce,cryst	
		$\gamma$		0.02075			$\alpha_K$
				0.06312	$\alpha_K$	0.17724	0.51
				0.09360	2.4	0.19797	0.40
				0.10978	2.1	0.2404	
				0.11820		0.2610	
				0.13053		0.3077	

All  $\gamma$ 's fitted into levels at 0.00842, 0.11820, 0.13895, 0.31619, 0.37931, 0.47291

E.N.Hatch, P.Marmier, F.Boehm, J.W.M.DuMond, Bull. Am. Phys. Soc. 1, No. 4, 170 E1 (1956); verbal report.

Yb <sup>169</sup>		$\tau$		0.00842		Yb <sup>(168)</sup> (pile n, $\gamma$ )	
		$\gamma$		0.02075			scin
				0.06312	$\alpha_K$	0.17724	0.51
				0.09360	2.4	0.19797	0.40
				0.10978	2.1	0.2404	
				0.11820		0.2610	
				0.13053		0.3077	

20%<sup>§</sup> (0.023) 146+ 0 178

250+ 0.064 ~0.194

34+ 0.094 214+ 0.198

144+ 0.110 ~0.240

~0.120 ~0.260

91+ 0.133 60+ 0.308

x 1130+ K x ray

(0.110  $\gamma$ )(0.178, 0.198, ~0.260  $\gamma$ )

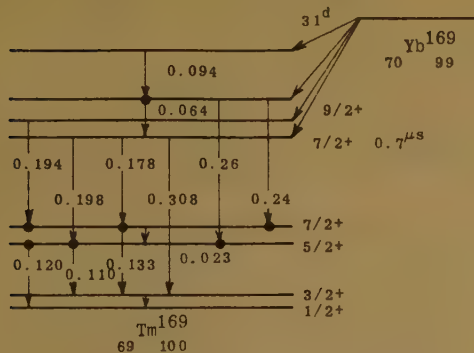
(0.133  $\gamma$ )(0.178, ~0.194, ~0.240  $\gamma$ )

(0.198  $\gamma$ )(0.110, ~0.120  $\gamma$ )

Continued

$Yb^{169}$   
70 99  
31<sup>d</sup>

Only 0.064  $\gamma$  and 0.094  $\gamma$  precede 0.7  $\mu s$  level  
 $\gamma\gamma$  delay  
No  $\epsilon$  to 0.120 or 0.142 level  
 $x\gamma$  delay  
\*Observed only in coincidence spectra  
§From intensities of (0.110  $\gamma$ ) $\gamma$  and (0.178  $\gamma$ ) $\gamma$   
†Photons per 10<sup>3</sup> disintegrations



S.A.E. Johnsson, Phys. Rev. 100, 835 (1955).

$Yb^{171}$   
70 101  $\mu$

ground state

+0.49 6

S

K. Krebs, H. Nelkowski, Z. Phys. 141, 254 (1955).

$Yb^{173}$   
70 103  $\mu$

ground state

J 5/2  
 $\mu$  -0.67 1

S

K. Krebs, H. Nelkowski, Z. Phys. 141, 254 (1955). Ann. Physik 15, 124 (1954).

$Yb^{175}$   
70 105  
4.2<sup>d</sup>

$\tau$  4.2<sup>d</sup> f  $Yb^{(174)}$  (pile n,  $\gamma$ )  
 $\beta^-$  ~25+ 0.374 30 sd  
100+ 0.471 3  
 $\gamma(Lu^{175})$  0.1141 K/L = 2.9  $s\pi$  ce  
0.1378  $L_1:L_2:L_3 = 100:41:27$   
0.1450 K/L ~2  
0.2829 K/L ~6  
0.3970 K/L = 5.4

J.M. Cork, M.K. Brice, D.W. Martin, L.C. Schmid, R.G. Helmer, Phys. Rev. 100, 1237A (1955); verbal report.

$\gamma(Lu^{175})$  sl ce, cryst  
0.11381 0.2513  
0.13765 0.28257  
0.14485 0.3961

All  $\gamma$ 's fitted into levels at 0.11381, 0.25146, 0.39631

P. Boehm, E.N. Hatch, P. Marmier, J.W.M. DuMond, Bull. Am. Phys. Soc. 1, No. 4, 170 (1956).

$Yb^{175}$   
70 105  
4.2<sup>d</sup>

$\gamma(Lu^{175})$  0.39532 12 cryst

N. Ryde, B. Andersson, Proc. Phys. Soc. 68B, 1117 (1955).

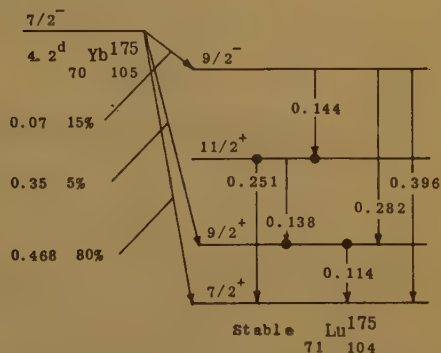
$\beta^-$  15% 0.070 10 scin  $\beta\gamma$   
5% 0.350 10 scin  $\beta\gamma$   
80% 0.468 5 sl  
No 0.317  $\beta^-$  (< 0.5%) scin  $\beta\gamma$   
 $\gamma(Lu^{175})$  scin,  $s\pi$  ce  
7† 0.1136 2  $\alpha_K = 1.7$  4\*  
 $L_1:L_2:L_3 = 3:1:1$  E2/M1 = 0.30  
< 1† 0.1376 2  
< 2† 0.144  
< 1† 0.251 M2/E1  
10† 0.2824 2  $\alpha_K = 0.038$  10 0.03  
K/LM  $\geq 5$   
23† 0.3960 2  $\alpha_K = 0.050$  5 0.20  
K/LM = 5.8

(0.07  $\beta$ )(0.282, 0.396  $\gamma$ ) scin

(0.35  $\beta$ )(0.114  $\gamma$ )

(0.144  $\gamma$ )(0.114, 0.138, 0.251  $\gamma$ )

\*From (0.282  $\gamma$ )(K x ray, 0.114  $\gamma$ )



J.P. Mize, M.E. Bunker, J.W. Starnes, Phys. Rev. 100, 1390 (1955); 99, 671A (1955).

$Yb^{177}$   
70 107  
1.8<sup>h</sup>

$\tau$  1.88<sup>h</sup> 10  $Yb^{(176)}$  (pile n,  $\gamma$ )  
 $\gamma(Lu^{177})$  ~25+ 0.119 scin  $\beta\gamma$   
100+ 0.148 scin  
~5+ 1.080  
~5+ 1.228

( $E_\beta > 0.5$ )(0.119  $\gamma$ ) scin

(1.080  $\gamma$ )(0.148  $\gamma$ ) No (1.228  $\gamma$ )(0.148  $\gamma$ )

Not p 6.8<sup>d</sup>  $Lu^{177}$  (expected decay, ce, and  $\beta$  not observed)

J.M. Cork, M.K. Brice, D.W. Martin, L.C. Schmid, R.G. Helmer, Phys. Rev. 100, 1237A (1955); verbal report.

$Lu?$   
71

$\gamma$   $Lu(\gamma, \gamma\gamma)$  0.131  $\gamma\gamma$  delay = 75  $\mu s$  scin

M.G. Stewart, A.J. Bureau, C.L. Hammer, Bull. Am. Phys. Soc. 1, No. 4, 206, R2 (1956); verbal report.

Lu <sup>175</sup>	Levels	Lu <sup>(175)</sup> ( $\alpha, \alpha'\gamma$ )	E <sub><math>\alpha</math></sub> = 6; scin
71 104	$\gamma$	0.114 1 $\epsilon$ B(E2) = 0.72	
		0.250 3 = 0.20	

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150 (1955).

Level	Lu <sup>(175)</sup> ( $\alpha, \alpha'\gamma$ )	E <sub><math>\alpha</math></sub> = 6
	<u>0.250 level</u>	
$\gamma$	100† 0.136	scin
	92† 0.250	

G.M. Temmer, N.P. Heydenburg, Bull. Am. Phys. Soc. 1, No. 1, 43, K11 (1956); verbal report.

Lu <sup>176</sup>	Level	Lu <sup>(176)</sup> ( $\alpha, \alpha'\gamma$ )	E <sub><math>\alpha</math></sub> = 6; scin
71 105	$\gamma$	0.180 2 $\epsilon$ B(E2) = 1.14	
	Assignment to Lu <sup>175</sup> also possible		

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150 (1955).

Lu <sup>177</sup>	$\gamma$ (Hf <sup>177</sup> )	0.11308 3	cryst
71 106		0.20786 4	
6.8 <sup>d</sup>			

N. Ryde, B. Andersson, Proc. Phys. Soc. 68B, 1117 (1955).

Lu <sup>177</sup>	Resonances	Lu <sup>(176)</sup> (n)	E <sub>n</sub> = 0.06 to 3 ev
71 106		E <sub>0</sub> (ev) $\sigma_0$ $\Gamma_\gamma$ (mev) g $\Gamma_n$ (mev)	
		0.143 1 14400 61 2 0.046	
		1.574 6 <sup>*</sup> 8300 55 5 0.26 3	
		2.604 10 <sup>8</sup> 79000 50 1 4.5 1	

\* Assignment to Lu<sup>176</sup> possible

<sup>8</sup> Assignment based on activation of 6.8<sup>d</sup>Lu

H.H. Landon, Phys. Rev. 100, 1414 (1955); 92, 656 (1953).

Hf <sup>175</sup>	$\gamma$ (Lu <sup>175</sup> )	Hf <sup>174</sup> (n, $\gamma$ ); scin, $\pi$ 7ce <sub>1</sub>
72 103	4†	0.0893 2
70 <sup>d</sup>		L <sub>1</sub> :L <sub>2</sub> :L <sub>3</sub> = 10:1:1 E2/M1 = 0.1
		0.1136 2
	~1†	0.2293 2 K/L ~ 2
		0.3186 2
	100†	0.3429 2
		L <sub>1</sub> :L <sub>2</sub> :L <sub>3</sub> = 10:0:0 E2/M1 ≤ 0.25
		K/LM = 5.0
	~2†	0.4322 2

(0.343  $\gamma$ )(K x ray, 0.089  $\gamma$ ) and relative photon intensities indicate ~20%  $\epsilon$  to 0.432 level, ~80%  $\epsilon$  to 0.343 level, <10%  $\epsilon$  to g.s.

J.P. Mize, M.E. Bunker, J.W. Starner, Phys. Rev. 100, 1390 (1955).

Hf <sup>175</sup>	$\gamma$ (Lu <sup>175</sup> )	0.08936	sl ce, cryst
72 103		0.11381	0.3189
70 <sup>d</sup>		0.16133	0.34340
		0.22937	0.4328

0.06169 photon interpreted as Lu K <sub>$\beta$ 5</sub> x ray  
All  $\gamma$ 's fitted into levels at 0.11381, 0.34340, 0.43276, 0.50473

F. Boehm, E.N. Hatch, P. Marmier, J.W.M. DuMond, Bull. Am. Phys. Soc. 1, No. 4, 170 E2 (1956); verbal report.

Hf <sup>176</sup>	Level	Hf <sup>176</sup> ( $\alpha, \alpha'\gamma$ )	E <sub><math>\alpha</math></sub> = 6; scin
72 104	$\gamma$	0.087 1 $\epsilon$ B(E2) = 0.56	

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Hf <sup>177</sup>	Levels	Hf <sup>177</sup> ( $\alpha, \alpha'\gamma$ )	E <sub><math>\alpha</math></sub> = 6; scin
72 105	$\gamma$	0.112 1 $\epsilon$ B(E2) = 0.77	
		0.250 3 = 0.55	

H.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Level	Hf <sup>177</sup> ( $\alpha, \alpha'\gamma$ )	E <sub><math>\alpha</math></sub> = 6
	<u>0.250 level</u>	
$\gamma$	10† 0.138	scin
	48† 0.250	

G.M. Temmer, N.P. Heydenburg, Bull. Am. Phys. Soc. 1, No. 1, 43, K11 (1956); verbal report.

Hf <sup>178</sup>	Level	Hf <sup>178</sup> ( $\alpha, \alpha'\gamma$ )	E <sub><math>\alpha</math></sub> = 6; scin
72 106	$\gamma$	0.090 1 $\epsilon$ B(E2) = 0.85	

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Hf <sup>179</sup>	Levels	Hf <sup>179</sup> ( $\alpha, \alpha'\gamma$ )	E <sub><math>\alpha</math></sub> = 6; scin
72 107	$\gamma$	0.119 1 $\epsilon$ B(E2) = 0.67	
		0.260 3 = 0.056	

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Level	Hf <sup>179</sup> ( $\alpha, \alpha'\gamma$ )	E <sub><math>\alpha</math></sub> = 6
	<u>0.260 level</u>	
$\gamma$	100† 0.141	scin
	81† 0.260	

G.M. Temmer, N.P. Heydenburg, Bull. Am. Phys. Soc. 1, No. 1, 43, K11 (1956); verbal report.





Ta <sup>182</sup> 73 109	Resonances		Ta <sup>181</sup> (n, γ)		pulsed n's	
	35.5 ev	84.9			scin γ	
	39.2	89.4	126.2	194.5	231.8	
	49.1	91.1	136.2	199.4	236.4	
	57.5	96.7	138.1	203.8	241.8	
	63.0	99.0	143.9	207.9	246.6	
	76.7	103.3	148.1	215.4	258.4	
	77.5	105.3	149.4	219.3	263.0	
	78.7	114.7	166.0	221.6	272.2	
	82.7	118.0	175.1	224.5	275.7	

G. Grimm, J. S. Desjardins, J. Rosen, J. Rainwater, W. W. Havens, Jr., Bull. Am. Phys. Soc. 1, No. 4, 176 F14 (1956); verbal report.

Ta <sup>186</sup> 73 113 10 <sup>m</sup>	τ		10.5 <sup>m</sup> 5		W <sup>186</sup> (20-Mev n, p) chem	
					not by W(≤28-Mev γ)	
	β <sup>-</sup>	2.2			scin	
	γ(W <sup>186</sup> )				scin	
	25+	0.125	45+	0.51		
	100+	0.200	65+	0.73		
	25+	0.300	15+	0.94		
	20+	0.410	≤10+	~1.1		

(2.2 β) γ

A. J. Poë, Phil. Mag. 46, 1165 (1955).

W ? 74	γ	W(γ, n? γ)		E <sub>γ</sub> ≥ 8.3; scin
		0.366	γγ delay = 14.6 <sup>μs</sup> 3	

M. G. Stewart, A. J. Bureau, C. J. Hammer, Bull. Am. Phys. Soc. 1, No. 4, 206 R2 (1956); verbal report.

γ	W(γ, n? γ)		E <sub>γ</sub> ≤ 24; scin
	0.370 15	γγ delay = 16 <sup>μs</sup> 1	
		α ~ 0.25	x/γ

S. H. Vegors, Jr., P. Axel, Phys. Rev. 101, 1067 (1956).

W <sup>183</sup> 74 109	Resonance		W <sup>(182)</sup> (n)		cryst	
	E <sub>0</sub> (ev)	σ <sub>0</sub>	Γ <sub>γ</sub> (mev)	Γ <sub>n</sub> (mev)		
	4.14	3	19000	46 2	1.43	3

H. H. Landon, Phys. Rev. 100, 1414 (1955).

Re 75	Resonances		Re(n)		E <sub>n</sub> = 1 to 13 ev	
					cryst	
			2.156 4 <sup>+</sup> ev			
			4.416 8 <sup>8</sup>	11.1		
			5.90	11.9		
			7.2	12.8		

\*Re<sup>186</sup>, <sup>8</sup>Re<sup>188</sup>, q.v.

G. Igo, Phys. Rev. 100, 1338; 99, 610A (1955).

Re <sup>185</sup> 75 110	Levels	Re <sup>(185)</sup> (p, p' γ)		E <sub>p</sub> = 3.2; scin
		0.125 level		
	γ	0.125 4	B(E2) = 1.2 (α = 4.5)	
		0.280 level		
	γ	0.125 4		
		8 <sup>†</sup> 0.158 5		
		1 <sup>†</sup> 0.280 10	B(E2) = 0.5 (α = 0.15)	

R. H. Davis, A. S. Divatia, R. D. Moffat, D. A. Lind, Phys. Rev. 100, 1266A (1955); verbal report.

Levels	Re <sup>185</sup> (p, p' γ)		E <sub>p</sub> = 3.7; scin
	0.126 level		
γ	0.126	B(E2) = 1.2 <sup>*</sup> (α = 4.5)	
	0.286 level		
γ	0.126		
	4.0 <sup>†</sup> 0.160		
	1 <sup>†</sup> 0.286		
	(0.126 γ)(0.160 γ)		

E. A. Wolicki, L. W. Fagg, E. H. Geer, Phys. Rev. 100, 1265A (1955); verbal report.

Re <sup>186</sup> 75 111 3.8 <sup>d</sup>	γ(Os <sup>186</sup> )	0.13722 3	cryst
N. Ryde, B. Andersson, Proc. Phys. Soc. 68B, 1117 (1955).			

Re <sup>186</sup> 75 111	Resonance		Re <sup>(185)</sup> (n)		cryst	
	E <sub>0</sub> (ev)	σ <sub>0</sub>	Γ <sub>γ</sub> (mev)	g <sub>Γ<sub>n</sub></sub> (mev)		
	2.156 4	12300	55.7 6	3.30 5		

G. Igo, Phys. Rev. 100, 1338; 99, 610A (1955).

Re <sup>187</sup> 75 112	Levels	Re <sup>(187)</sup> (p, p' γ)		E <sub>p</sub> = 3.2; scin
		0.135 level		
	γ	0.135 4	B(E2) = 2.0 (α = 4.5)	
		0.300 level		
	γ	0.135 4		
		5.4 <sup>†</sup> 0.163 5		
		1 <sup>†</sup> 0.300 10	B(E2) = 0.65 (α = 0.15)	

R. H. Davis, A. S. Divatia, R. D. Moffat, D. A. Lind, Phys. Rev. 100, 1266A (1955); verbal report.

Levels	Re <sup>187</sup> (p, p' γ)		E <sub>p</sub> = 3.7; scin
	0.135 level		
γ	0.135	B(E2) = 1.1 <sup>*</sup> (α = 4.5)	
	0.303 level		
γ	0.135		
	3.8 <sup>†</sup> 0.168		
	1 <sup>†</sup> 0.303		
	(0.135 γ)(0.168 γ)		

E. A. Wolicki, L. W. Fagg, E. H. Geer, Phys. Rev. 100, 1265A (1955); verbal report.





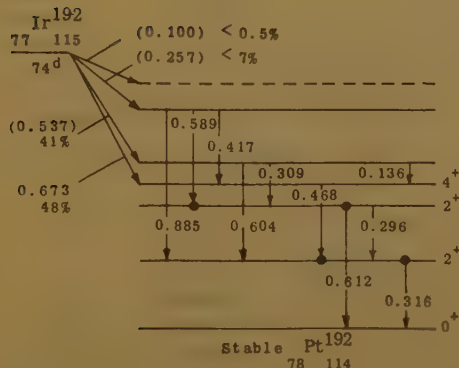
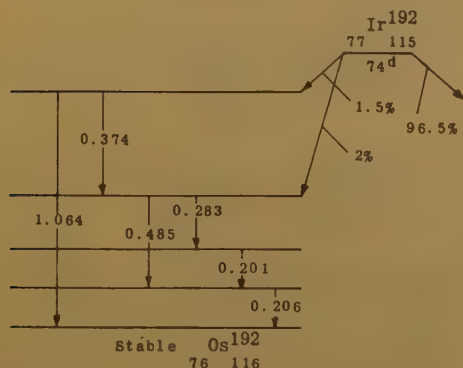
$\text{Ir}^{192}$ 77 115 74 <sup>d</sup> R.S.	$\beta^-$	$<0.5\%$ (0.100) 7% (0.257) 41% (0.537)	$\text{Ir}^{(191)}$ (pile n, $\gamma$ )	$\alpha_K$	$\alpha_{L1L2}$	$\alpha_{L3}$
	No $\beta^+$ ( $<10^{-4}\%$ )		48% 0.673 10 sd cryst $\gamma^+$			
	$\epsilon$ 3.5%		sd ce,cryst			
	$\gamma(\text{Os}^{192})$					
	4.6†	0.20131 4	0.30	0.12	0.07	
	39†	0.20575 4	0.16	0.077	0.04	
	6†	0.28335 20	0.04			
	19†	0.3747 5				
	39†	0.48475 23	0.022			
	0.5†	1.060 30				
	1.9†	0.13633 2	1.0	0.63	0.44	
	360†	0.29594 9	0.065	0.025	0.006	
	350†	0.30845 9	0.069	0.028	0.008	
	1000†	0.31646 9	(0.054) <sup>§</sup>	0.018	0.006	
	16†	0.4166 7	0.019			
	640†	0.46798 22	0.022	0.0052	0.001	
	71†	0.5884 6	0.011	0.0031		
	140†	0.6045 9	0.016	0.0031		
	84†	0.6129 9	0.011	0.0023		
	1†	0.785 20				
	5†	0.885 2	0.007			

(0.468 $\gamma$ )(0.316 $\gamma$ )( $\theta$ ) J = 4, 2, 0

(0.588 $\gamma$ )(0.613 $\gamma$ )( $\theta$ ) J = 4, 2, 0

( $\sim$ 0.30 $\gamma$ )(0.885 $\gamma$ )

Not measured, determined from  $\gamma$  transitions  
 $\alpha$ 's based on this theoretical  $\alpha_K(E2)$



L.L.Baggerly, P.Warmier, P.Boehm, J.W.M.  
 DuMont, Phys. Rev. 100, 1364 (1955).

$^{192}_{77}\text{Ir}_{115}$	Resonances	$\text{Ir}^{(191)}(\text{n})$	$E_n = 0.45$ to 6 ev			
		$E_o(\text{ev})$	$\sigma_o$	$\Gamma_\gamma(\text{mev})$	$g\Gamma_n(\text{mev})$	
		0.654 2	13800	73.5 1	0.25 1	
		5.36 4	24000	67 5	3.6 2	
	$^{194}\text{Ir}^{194}$	not produced at these resonances				

H.H.Landon, Phys. Rev. 100, 1414 (1955); 99, 610A (1955).

$\text{Ir}^{193}$ 77 116	Levels	$\text{Ir}^{(193)}$ (p,p' $\gamma$ )	$E_p = 3.2$ ; scin
		0.143 level	
	$\gamma$	0.143 4 B(E2) = 1.0 ( $\alpha = 4.4$ )	
		0.368 level	
	$\gamma$	0.143 4	
		0.3† 0.230 6	
		1† 0.368 8 B(E2) = 0.35 ( $\alpha = 0.04$ )	

R.H.Davis, A.S.Divatia, R.D.Moffat, D.A.Lind,  
 Phys. Rev. 100, 1266A (1955); verbal report.

$\text{Ir}^{194}$ 77 117 19 <sup>h</sup> R.S.	$\gamma(\text{Pt}^{194})$	0.32907 8	cryst
	N.Ryde, B.Andersson, Proc. Phys. Soc. 68B, 1117 (1955).		

$\text{Ir}^{194}$ 77 117	Resonance	$\text{Ir}^{(193)}$ (n)	$E_n = 0.45$ to 6 ev
		$E_o(\text{ev})$ $\sigma_o$ $\Gamma_\gamma(\text{mev})$ $g\Gamma_n(\text{mev})$	
		1.303 5 10400 86.5 1 0.46 1	
	Assignment based on activation of 19 <sup>h</sup> Ir cryst		

H.H.Landon, Phys. Rev. 100, 1414 (1955); 99, 610A (1955).

Pt 78	"82 <sup>d</sup> Pt" identified as 76 <sup>d</sup> Ir <sup>192</sup> chem, scin $\gamma$
	G.W.Warren, R.W.Fink, Bull. Am. Phys. Soc. 1, No. 4, 171 E4 (1956).

$\text{Pt}^{193}$ 78 115 R.S.	$\tau < 500\gamma^*$	$\text{Pt}^{192}$ (pile n, $\gamma$ ) chem
	$\epsilon_L$	a,pc L x ray
	$\epsilon_K/\epsilon_L < 0.001$ from absence of K x ray	pc
	No $\gamma$ , no particles	pc,scin
	*Assuming $\sigma = 0.08$	

R.A.Naumann, Bull. Am. Phys. Soc. 1, No. 1, 42. K9 (1956).

$\text{Pt}^{195}$ 78 117	Levels	$\text{Pt}^{(195)}$ ( $\alpha, \alpha'\gamma$ )	$E_\alpha = 4.0$
		0.029 level	
	$\gamma$	0.029	scin $\gamma$
		0.126 level	
	$\gamma$	0.097	s $\pi$ ce
		0.210 level	
	$\gamma$	0.210	B(E2) = 0.5 <sup>*</sup> s $\pi$ ce
		0.240 level	
	$\gamma$	(0.240)	$\alpha_K < 0.2$ E2 s $\pi$ ce
	*Used B(E2) = 0.334 for 0.279 Au <sup>197</sup> level		

E.M.Berstein, H.W.Lewis, Phys. Rev. 100, 1345 (1955).

Pt <sup>197</sup> 78 119	Levels	Au <sup>197</sup> (n,p)		E <sub>n</sub> = 14; ppl
		Level	$\Gamma$	
		100†	g.s.	1.1
		55†	1.53 15	1.0
		47†	2.52 15	1.2
		45†	3.96 15	0.9
		22†	5.77 15	1.2
		16†	7.22 15?	1.0

R.A. Peck, Jr., Bull. Am. Phys. Soc. 1, No. 1, 40, JAB (1956); verbal report.

Au <sup>194</sup> 79 115 39 <sup>h</sup>	$\gamma$ (Pt <sup>194</sup> )	0.290	~130 <sup>d</sup> Hg source; sl ce <sub>K</sub>
		0.330	
		~1.5	(ce <sub>K</sub> ) $\gamma$
		~2	scin
	(ce <sub>K</sub> 0.290 $\gamma$ )(0.330, ~1.5 $\gamma$ )		sl, scin
	(ce <sub>K</sub> 0.330 $\gamma$ )(0.290, ~1.5 $\gamma$ )		

J. Brunner, H. Guhl, J. Halter, H. J. Leisi, Helv. Phys. Acta 28, 475A (1955).

Au <sup>195</sup> 79 116 185 <sup>d</sup> g.s.	$\gamma$ (Pt <sup>195</sup> ) 1†	0.031	Pt <sup>(194)</sup> (15-Mev d,n)
	12†	0.099	2† 0.130 scin
			(0.099 $\gamma$ )(K x ray, 0.031 $\gamma$ )
	(K x ray)(0.130 $\gamma$ )	No (0.099 $\gamma$ )(0.130 $\gamma$ )	

V.R. Potnis, Bull. Am. Phys. Soc. 1, No. 4, 170 E3 (1956); verbal report.

$\gamma$ (Pt <sup>195</sup> )	0.130	sl ce
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J. Brunner, H. Guhl, J. Halter, H. J. Leisi, Helv. Phys. Acta 28, 475A (1955).

Au <sup>195</sup> 79 116 30 <sup>s</sup>	$\gamma$		40 <sup>h</sup> Hg <sup>195</sup> source
	87°	0.0565	$\alpha \sim \infty$ scin; s $\pi$ , sl ce
	19.9°	0.2615	L <sub>2</sub> : L <sub>3</sub> : M = 34: 32: 22
			$\alpha = 0.25$ 3
			K: L: M = 16: 3: 0.85
	0.25°	0.318	(ce <sub>LM</sub> only)
	*Relative ce intensities		

R. Joly, J. Brunner, J. Halter, O. Huber, Helv. Phys. Acta 28, 403 (1955); 26 591A (1953).

Au <sup>196</sup> 79 117 5.6 <sup>d</sup> g.s.	$\gamma$ (Pt <sup>196</sup> )	0.330	Au <sup>197</sup> (33-Mev p,d) chem
		0.360	scin
	$\gamma$ (Hg <sup>196</sup> )	0.430	
	(0.330 $\gamma$ )(0.360 $\gamma$ )		
	$\beta$ (0.430 $\gamma$ )		

J. Brunner, H. Guhl, J. Halter, H. J. Leisi, Helv. Phys. Acta 28, 475A (1955).

Au <sup>197</sup> 79 118 7.4 <sup>s</sup>	$\gamma$	402°	0.130	Au <sup>197</sup> (n,n'), d 23 <sup>h</sup> Hg <sup>197</sup> ; sl ce
		124°	0.277	K: L: M = 30.5: 268: 104
		1.4°	0.407	L <sub>2</sub> /L <sub>3</sub> = 1.3 $\alpha \sim 0.8$
				K: L: M = 100: 19: 4.7
				$\alpha_K = 0.29$ 3
				K/LM = 2.3 $\alpha_K \geq 1.5$
				(ce 0.130 $\gamma$ )(0.277 $\gamma$ ) sl, scin
				(0.277 $\gamma$ )(0.407 $\gamma$ ) $\geq 500$ scin
				*Relative ce intensities

R. Joly, J. Brunner, J. Halter, O. Huber, Helv. Phys. Acta 28, 403 (1955); 26, 591A (1953).

$\gamma$	(0.279)	E2/M1 = 0.12 3	$\gamma\gamma(\theta)$
		or 2.0 3	
	(0.130 $\gamma$ )(0.279 $\gamma$ )( $\theta$ )	J = 11/2, 5/2, 3/2	

J.V. Kane, S. Frankel, Bull. Am. Phys. Soc. 1, No. 4, 171 E9 (1956).

Au <sup>197</sup> 79 118	Levels	Au <sup>197</sup> ( $\alpha, \alpha'\gamma$ )	E <sub>a</sub> = 3.25
		0.077 level	B(E2) = 0.18 s $\pi$ ce
	$\gamma$	0.077	
		0.268 level	B(E2) 0.13°
	$\gamma$	0.191	
		0.279 level	
	$\gamma$	0.279	K/L = 5.5
			*Used B(E2) = 0.334 for 0.279 level

E.M. Bernstein, H.W. Lewis, Phys. Rev. 100, 1345; 99, 617A (1955).

$\gamma$	Au <sup>197</sup> (p,p' $\gamma$ )	E <sub>p</sub> = 3.8
7.9°	0.1913 8	K/L = 4.2 s $\pi$ ce
1.9°	0.2698 11	K/L = 6
18.3°	0.2795 11	K: L: MN = 20: 3.1: 1
0.5°	0.5477 20	K/L = 3.6
	* $\sigma(90^\circ)$ for ce <sub>K</sub> in $\mu$ b/sterad	

M.S. Moore, C.M. Class, F.W. Prosser, Jr., J.P. Schiffer, Bull. Am. Phys. Soc. 1, No. 2, 88, H2 (1956).

$\gamma$	Au <sup>197</sup> (n,n' $\gamma$ )	E <sub>n</sub> = 0.35 to 3.9
	0.20	scin
	0.28	
	0.50	

R.B. Day, A.E. Johnsrud, D.A. Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956).

Au <sup>198</sup> 79 119 2.7 <sup>d</sup>	$\gamma$ (Hg <sup>198</sup> )	0.4118 3	$\alpha_K = 0.029$ EA
			$\alpha_L = 0.011$
			L <sub>1</sub> : L <sub>2</sub> : L <sub>3</sub> = 19 $\pm$ 3: 22 $\pm$ 3: 10

D.R. Connors, W.C. Miller, S. Waldman, Phys. Rev. 100, 1237A (1955); verbal report.

$\text{Au}^{198}$   
79 119  
2.7<sup>d</sup>  
 $\gamma(\text{Hg}^{198})$  (0.411)  $L_1 L_2 / L_3 = 5.9$  s  
K : L : M : N = 100 : 36 : 10 : 2.7

R.D.Birkhoff, W.W.Smith, H.H.Hubell, Jr.,  
J.S.Cheka, Rev. Sci. Instr. 26, 959 (1955).

$\text{Au}^{198}$   
79 119  
Capture  $\gamma$   $\text{Au}^{197}(\text{th n}, \gamma)$   
0.248 13 scin Cp  
Study covered  $E_\gamma = 0.1$  to 2.5

M.Reier, M.H.Shamos, Phys. Rev. 100, 1302  
(1955); 95, 636A (1954).

Capture  $\gamma$ 's  $\text{Au}^{197}(\text{n}, \gamma)$  cryst  
0.261 0.328  
0.271 0.343 double  
0.276 0.350  
0.291 double 0.354  
0.308 0.370 double  
0.311 0.381  
0.316 0.439

Study covered  $E_\gamma = 0.260$  to 0.440

D.Rose, B.Hamermesh, Bull. Am. Phys. Soc. 1,  
No. 4, 189 K13 (1956); verbal report.

$\text{Hg}^{192}$   $\tau$  6.3<sup>h</sup>  $\text{Bi}^{209}$  (480-Mev p) chem

5.7<sup>h</sup>  
A.P.Vinogradov, I.P.Alimarin, V.I.  
Baranov, A.K.Lavrukhina, T.V.Baranova,  
F.I.Pavlotskaya, Conf. Acad. Sci. on  
Peaceful Use of Atomic Energy, Chem. Sci.  
p. 132 July (1955); Consultants Bureau  
Trans. p. 85.

$\text{Hg}^{193}$   $\tau$  11<sup>h</sup>  $\text{Bi}^{209}$  (480-Mev p) chem

80 113  
12<sup>h</sup>  
A.P.Vinogradov, I.P.Alimarin, V.I.Baranov,  
A.K.Lavrukhina, T.V.Baranova, F.I.  
Pavlotskaya, Conf. Acad. Sci. on Peaceful  
Use of Atomic Energy, Chem. Sci. p. 132  
July (1955); Consultants Bureau Trans. p. 85.

$\text{Hg}^{193}$   
80 113  
12<sup>h</sup> + 4<sup>h</sup>  
 $\gamma(\text{Au}^{193})$  (0.032) 0.360 s  $\pi$ , sl ce  
(0.038) 0.364  
0.157 0.3812 0.920  
(0.186) 0.382 1.120  
(0.218) 0.394 1.170  
0.220 0.407 1.240  
(0.258) 0.499 1.320  
(0.291) 0.534 1.490  
0.300 0.571 1.630  
0.345 0.860

(0.218  $\gamma$ ) ( $\sim 0.40 \gamma$ ) (0.038  $\gamma$ ) (0.220  $\gamma$ )

J. Brunner, H. Guhl, J. Halter, H. J. Leisi,  
Helv. Phys. Acta 28, 475A (1955).

$\text{Hg}^{194}$   $\tau$   $\sim 130^d$   $\text{Au}^{197}$  (55-Mev p, 4n) chem

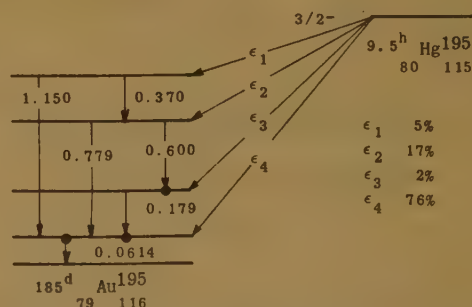
80 114  
 $\sim 130^d$   
No  $\gamma$  sl ce, scin  
 $\gamma$ 's observed assigned to  $39^h \text{Au}$

J. Brunner, H. Guhl, J. Halter, H. J. Leisi,  
Helv. Phys. Acta 28, 475A (1955).

$\text{Hg}^{195}$   $\tau$  9.5<sup>h</sup> 5  $\text{Au}^{197}$  (27-Mev d, 4n) chem

80 115  
9.5<sup>h</sup>  
g.s.  
 $\gamma(\text{Au}^{195})$  0.0614 L/M = 3.5 s  $\pi$ , sl ce  
 $L_1 : L_2 : L_3 = 1.1 : 1 : 1$   
 $\alpha \sim \infty$   
0.179  $\alpha_K = 0.85$  15  
4.5+ 0.390 20  
31+ 0.600  $\alpha_K \sim 0.02$   
0.779  $\alpha_K = 0.013$  K/LM = 4.5  
0.930 50  
22+ 1.150

(ce<sub>L</sub> 0.061  $\gamma$ ) (K x ray, 0.179, 0.60, 0.779, 1.150  $\gamma$ )  
(ce<sub>K</sub> 0.179  $\gamma$ ) (K x ray, 0.390, 0.60, 0.930  $\gamma$ )



R. Joly, J. Brunner, J. Halter, O. Huber, Helv.  
Phys. Acta 28, 403 (1955); 26, 591A (1953);  
27, 512A, 572 (1954).

$\text{Hg}^{195}$   $\gamma(\text{Au}^{195})$  0.172 s  $\pi$ , sl ce  
80 115  
40<sup>h</sup> + 9.5<sup>h</sup>  
0.2005 0.810  
0.207 0.920  
0.368 0.955  
0.388 1.010  
0.439 1.120  
0.525 1.180  
0.584 1.255

(0.388  $\gamma$ ) (0.368  $\gamma$ ) (0.207  $\gamma$ ) (0.179  $\gamma$ ) (0.920  $\gamma$ )  
(ce 0.262  $\gamma$ ) (ce 0.2005  $\gamma$ )  $\sim 100$   
Only new  $\gamma$ 's are listed; source: 40<sup>h</sup> + 9.5<sup>h</sup> Hg

J. Brunner, H. Guhl, J. Halter, H. J. Leisi,  
Helv. Phys. Acta 28, 475A (1955).

$\text{Hg}^{195}$   $\tau$  40.0<sup>h</sup> 5  $\text{Au}^{197}$  (27-Mev d, 4n) chem

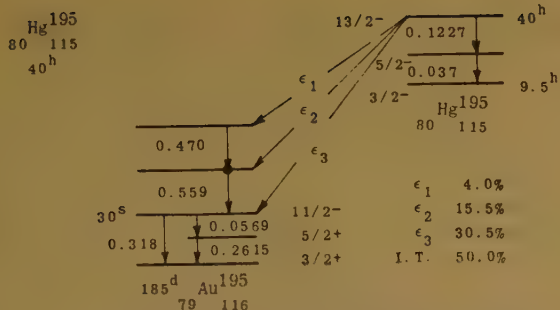
80 115  
40<sup>h</sup>  
 $\gamma(\text{Hg}^{195})$  0.037  $L_1 / L_2 \sim 10$  s  $\pi$ , sl ce  
L : M : N = 60 : 20 : 11  
 $\alpha \sim \infty$   
0.1227  $L_1 : L_2 : L_3 = 10 : 3 : 19$   
K : L : MN = 11 : 50 : 23  
 $\alpha \geq 24$

$\gamma(\text{Au}^{195})$  scin, sl ce  
34+ 0.470 5  
229+ 0.559 K : L : M = 50 : 9.3 : 2.3  
14+  $\sim 1.03$  scin

(ce<sub>K</sub> 0.559  $\gamma$ ) (K x ray, 0.470  $\gamma$ )

Continued





R. Joly, J. Brunner, J. Halter, O. Huber, *Helv. Phys. Acta* 28, 403 (1955); 26, 591A (1953); 27, 512A, 572 (1954).

Hg <sup>199</sup>	Levels	Hg <sup>(199)</sup> (p, p'γ)	E <sub>p</sub> = 3.2; scin
80 119	γ	0.159 4	B(E2) = 0.17 (α = 1.0)
		0.209 5	B(E2) = 0.06 (α = 0.7)

R. H. Davis, A. S. Divatia, R. D. Moffat, D. A. Lind, *Phys. Rev.* 100, 1266A (1955); verbal report.

Levels	Hg <sup>(199)</sup> (n, n'γ) 44 <sup>m</sup> Hg <sup>199</sup>	E <sub>n</sub> = 0.5 to 2
	0.61	
	0.98	
	1.28	
	1.84	

These levels feed IT state

C. P. Swann, F. R. Metzger, *Phys. Rev.* 100, 1329 (1955).

Hg <sup>197</sup>	γ(Au <sup>197</sup> )	Au <sup>197</sup> (27-Mev d, 2n) chem
80 117	1060°	0.0776 α ~ 2.3 sπ, sl ce
65h		L <sub>1</sub> : L <sub>2</sub> : L <sub>3</sub> = 100: 46: 34
E. S.		L: M: N = 831: 176: 53
	8.62°	0.1918 α <sub>K</sub> = 0.90 10
		K: L: M = 7.2: 1.1: 0.34
		(ce 0.077γ)(K x ray, ce 0.191γ, 0.191γ)
		Relative ce intensities

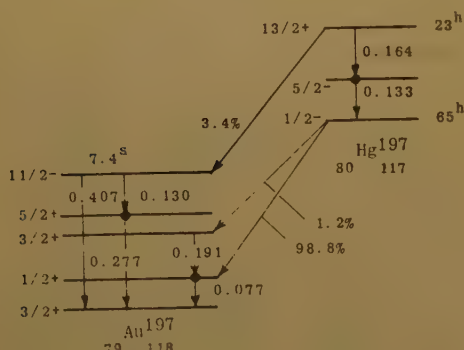
R. Joly, J. Brunner, J. Halter, O. Huber, *Helv. Phys. Acta* 28, 403 (1955); 26, 591A (1953).

Hg <sup>200</sup>	Level	Hg <sup>(200)</sup> (p, p'γ)	E <sub>p</sub> = 3.2; scin
80 120	γ	0.375 7	τ = 83 μs (α = 0.05)

R. H. Davis, A. S. Divatia, R. D. Moffat, D. A. Lind, *Phys. Rev.* 100, 1266A (1955); verbal report.

Hg <sup>197</sup>	γ	(0.133)	E2 = 100%	ce <sub>K</sub> γ(β)
80 117		(0.164)	E5/M4 ≤ 0.09	
23h			J = 13/2, 5/2, 1/2	
			Magnetic attenuation of correlation coefficients due to electron rearrangement shown	

F. Gimmi, E. Heer, P. Scherrer, *Helv. Phys. Acta* 28, 470A (1955).



R. Joly, J. Brunner, J. Halter, O. Huber, *Helv. Phys. Acta* 28, 403 (1955); 26, 591A (1953).

Capture γ's	Hg <sup>(199)</sup> (th n, γ)	s77 Cp
20†	0.37 1 > 3†	3.14 3
~3†	0.58 2 > 3†	3.25 3
6†	0.68 1.5 > 0.5†	3.50 5
~2†	0.83 2 > 0.5†	3.60 5
~7†	0.90 3 > 1†	3.80 5
~3†	1.01 2 > 1†	4.12 5
~2†	1.10 2 3.5†	~4.59 5
> 6†	1.22 1.5 6†	4.69 5
> 7†	1.29 1 10†	4.82 3
	1.41 2 3†	4.94 5
	~1.49 2 6†	5.05 3
> 4†	1.59 2 1.4†	~5.28 5
	~1.62 2 4.5†	5.44 3
> 13†	1.73 1 6.7†	5.67 3
	1.85 2 2†	~5.88 5
> 6†	2.02 1.5 10†	5.99 3
	2.10 3 2.4†	6.31 5
> 4†	2.29 3 4.5†	6.44 3
	2.40 3 0.03†	6.95 5
> 3†	2.64 3 0.03†	~7.08 5
> 1†	2.89 3 0.1†	7.66 3

†Photons/1.0 M captures

Levels proposed at 0.37, 0.95, 1.10, 1.59, 1.73, 2.02, 2.10, 1.40, 2.59, 2.75, 3.00, 3.12, 3.25, 3.34, 3.44, 3.91 Level scheme implies B<sub>n</sub> = 8.03 3

B. P. Adyasevich, B. D. Groshev, A. M. Demidov, *Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci.* p. 270 July (1955); Consultants Bureau Trans. p. 195.

Hg <sup>198</sup>	Level	Hg <sup>(198)</sup> (p, p'γ)	E <sub>p</sub> = 3.2; scin
80 118	γ	(0.439)	τ = 66 μs (α = 0.04)

R. H. Davis, A. S. Divatia, R. D. Moffat, D. A. Lind, *Phys. Rev.* 100, 136A (1955); verbal report.

Hg <sup>202</sup>	Level	Hg <sup>(202)</sup> (p, p'γ)	E <sub>p</sub> = 3.2; scin
80 122	γ	(0.439)	τ = 45 μs (α = 0.03)

R. H. Davis, A. S. Divatia, R. D. Moffat, D. A. Lind, *Phys. Rev.* 100, 136A (1955); verbal report.

Tl ? $\gamma$	Tl( $\gamma, \gamma$ )	$E_\gamma \leq 19.5$
81	0.410 15 } $\tau = 65 \mu s$	scin
	0.706 20 }	
	0.506 15	$\tau = 530 \mu s$

S.H. Vegors, Jr., P. Axel, Phys. Rev. 100, 1238A (1955); verbal report.

Tl $\gamma$	Tl( $n, n'\gamma$ )	$E_n = 0.35$ to 3.9
81	0.20	0.44 scin
	0.28	0.62
	0.40	0.70

R.B. Day, A.E. Johnsrud, D.A. Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956).

Tl <sup>195</sup> $\tau$	1.2 <sup>h</sup> $\text{Hg}^{196}$ (20-Mev $d, 3n$ ) chem
81 <sup>114</sup> $p$ 9.5 <sup>h</sup> $\text{Hg}^{195}$ chem; not $p$ 40 <sup>h</sup> $\text{Hg}^{195}$ chem (<20%)	
1.2 <sup>h</sup>	

J.D. Knight, E.W. Baker, Phys. Rev. 100, 1334; 99, 1646A (1955).

Tl <sup>197</sup> $\tau$	2.8 <sup>h</sup> $\text{Au}^{197}$ (39-Mev $\alpha, 4n$ ) chem
81 <sup>116</sup> $\gamma(\text{Hg}^{197})$	0.1526 5
2.8 <sup>h</sup> $p$ 65 <sup>h</sup> $\text{Hg}^{197}$ chem; not $p$ 23 <sup>h</sup> $\text{Hg}^{197}$ (<5%)	chem
g.s.	

J.D. Knight, E.W. Baker, Phys. Rev. 100, 1334; 99, 1646A (1955).

Tl <sup>198</sup> $\gamma(\text{Hg}^{198})$	$\text{Au}^{197}$ (34-Mev $\alpha, 3n$ ) chem
81 <sup>117</sup> $5.3^h$	0.194
g.s.	0.2267
	0.283
	(0.411)
	0.675
	~1.075
	~1.23
	~1.44

Unassigned ce: 0.132, 0.512, 0.715, 0.924

J.D. Knight, E.W. Baker, Phys. Rev. 100, 1334; 99, 1646A (1955).

Tl <sup>198</sup> $\gamma(\text{Tl}^{198})$	$\text{Au}^{197}$ (34-Mev $\alpha, 3n$ ) chem
81 <sup>117</sup> $100^*$	(0.2607)
1.8 <sup>h</sup>	(0.2824)
$\gamma(\text{Hg}^{198})$	0.194 ? $K/LM$
~2°	0.442 ~8
~3°	0.586 ~8
~6°	0.635 ~6

0.635 $\gamma$ /0.282 $\gamma$  ~1.1; 0.586 $\gamma$ /0.282 $\gamma$  ~1.1 scin  
Unassigned ce: 0.221, 0.292, 0.308, 0.339, 0.415  
0.436, 0.458, 0.467, 0.585, 0.642, 0.753, 0.816

\*Relative  $c_K$  intensities

J.D. Knight, E.W. Baker, Phys. Rev. 100, 1334; 99, 1646A (1955).

Tl <sup>204</sup> $E_\gamma$	0.376 (K x ray)(continuum $\gamma$ )
81 <sup>123</sup>	From $\gamma$ continuum endpoint = 0.293 20

R.G. Jung, M.L. Pool, Bull. Am. Phys. Soc. 1, No. 4, 172 E11 (1956).

Tl <sup>208</sup> $\gamma(\text{Pb}^{208})$	(0.511) $E2/M1 = 0.04$ $\gamma\gamma(\theta, L)$
81 <sup>127</sup> $3.1^m$	(0.583) $E2$
	(0.860) $E2/M1 \sim 0.0008$
	(2.615) $E3$
	(0.511 $\gamma$ )(0.583 $\gamma$ )( $\theta, L$ ) $J = 5^-, 5^-, 3^-$
	(0.583 $\gamma$ )(2.615 $\gamma$ )( $\theta, L$ ) $J = 5^-, 3^-, 0^+$
	(0.860 $\gamma$ )(2.615 $\gamma$ )( $\theta, L$ ) $J = 4^-, 3^-, 0^+$

G.T. Wood, P.S. Jastram, Phys. Rev. 100, 1237A (1955).

Pb <sup>204</sup> $E_\gamma$	(0.375) $E2$ 100%
82 <sup>122</sup> $68^m$	(0.899) $E2$ 100%
	(0.912) $E5$ 100%
	(0.375 $\gamma$ )(0.899 $\gamma$ )( $\theta$ ) $J = 4, 2, 0$
	(0.912 $\gamma$ )(0.375 $\gamma$ )( $\theta$ ) $J = 9, 4, 2, 0$
	(0.912 $\gamma$ )(0.899 $\gamma$ )( $\theta$ ) $J = 9, 4, 2, 0$

J.R. Huizenga, V.E. Krohn, S. Raboy, Bull. Am. Phys. Soc. 1, No. 1, 43, K10 (1956).

Pb <sup>206</sup> Levels	Pb <sup>206</sup> ( $n, n'$ )	$E_n = 2.45$ pulsed $n's$
82 <sup>124</sup> $51^\dagger$	0.80	
	$44^\dagger$ 1.44	
	$32^\dagger$ 1.74	
	$\dagger\sigma(90^\circ)$ in mb/sterad	

L. Cranberg, J.S. Levin, Bull. Am. Phys. Soc. 1, No. 1, 56, R10 (1956); verbal report.

$\gamma$	Pb <sup>206</sup> ( $n, n'\gamma$ )	$E_n = 0.35$ to 3.9
	$E_\gamma$	Thresh
	30 $^\dagger$ 0.535 5	1.38 3 scin
	17 $^\dagger$ 0.662 5	1.475 30
	50 $^\dagger$ 0.803 5	0.78 3
		1.36 5 2.250 15
		1.45 5 1.55 10
	10 $^\dagger$ 1.68 3	1.75 10
	$\dagger\sigma(90^\circ)$ at $E_n = 2.59$ in mb/sterad	

R.B. Day, A.E. Johnsrud, D.A. Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956); verbal report.

Pb <sup>207</sup> Capture $\gamma$	Pb <sup>(206)</sup> ( $th n, \gamma$ )	$s\pi$ Cp
82 <sup>125</sup>	6.74 3	

B.P. Adyasevich, B.D. Groshev, A.M. Demidov, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 270 July (1955); Consultants Bureau Trans. p. 195.

<sup>208</sup> Pb 82 126	Capture $\gamma$	<sup>207</sup> Pb (th n, $\gamma$ ) 7.40 3	577 Cp	<sup>209</sup> Bi 83 126	Levels	<sup>209</sup> Bi (n, n')	$E_n = 4.3$ ; scin pulsed n's, 90°
		No other $\gamma$ (< 10% of 7.40 $\gamma$ )				0.9 ? 1.8	
		B.P. Adyasevich, B.D. Groshev, A.M. Demidov, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 270 July (1955); Consultants Bureau Trans. p. 195.				R.V. Smith, Bull. Am. Phys. Soc. 1, No. 4, 175 F2 (1956); verbal report.	
<sup>212</sup> Pb 82 130 11 <sup>h</sup>	$\gamma$ ( <sup>212</sup> Bi) (ce <sub>K</sub> 0.238 $\gamma$ /100 $\beta$ 's = 30 $\pm$ 2)	K/L = 5.5 2 sd ce		<sup>210</sup> Bi 83 127 5.0 <sup>d</sup>	p 4.2 <sup>m</sup> Tl <sup>206</sup> 0.00017 2 %		chem
		O.B. Nielsen, Kgl. Danske Videnskab. Selskab Mat.-fys. Medd. 30, No. 11 (1955).				R.W. Fink, G.W. Warren, B.L. Robinson, R.R. Edwards, Bull. Am. Phys. Soc. 1, No. 4, 171 E5 (1956).	
	$\gamma$ ( <sup>212</sup> Bi)	$\frac{L_1}{L_2} : \frac{L_2}{L_3} : \frac{L_3}{M_1} : \frac{M_1}{M_2}$ (0.238) 1000: 108: 8 : 240: 28 s ce		<sup>210</sup> Bi 83 127	Resonances	<sup>209</sup> Bi (n)	$E_n = 2$ to 20000 ev chopper
						$E_a$ (kev) $\Gamma$ (ev)	
						0.810 5.8 3	
						2.37 17 2	
						13 double	
		V.M. Kel'man, V.A. Romanov, R.Ja. Metshvapichichirli Doklady Akad. Nauk. SSSR 103, 577 (1955).				L.M. Bollinger, D.A. Dahlberg, R.R. Palmer, G.E. Thomas, Phys. Rev. 100, 126 (1955); 95, 645A (1954).	
	$\gamma$ ( <sup>212</sup> Bi)	(0.238) K/L = 5.9 4 $L_1/L_2 = 10.0$ 7 sd ce					
		E. Sokolowski, K. Edvarson, K. Siegbahn, Nuclear Phys. 1, 160 (1956).					
<sup>202</sup> Bi 83 119	$\tau_1$ $\tau_2$	30 <sup>m</sup> 1.5 <sup>h</sup>	U(480 - Mev p) chem	<sup>212</sup> Bi 83 129 60.5 <sup>m</sup>	$\gamma$ (Tl <sup>208</sup> )	11 <sup>h</sup> Pb <sup>212</sup> source	
					113* (0.287)	K/L = 5.3 sd; $\alpha$ (ce)	
					27* (0.327)		
					4.0* (0.431)		
					34* (0.451)	K/L = 5	
					2.5* (0.471)		
					$\alpha$ (ce 0.287, 0.327, 0.431, 0.451, 0.471 $\gamma$ )		
					*ce <sub>K</sub> per 10 <sup>5</sup> disintegrations		
		A.P. Vinogradov, I.P. Alimarin, V.I. Baranov, A.K. Lavrukhina, T.V. Baranova, F.I. Pavlotskaya, A.A. Bragina, Y.V. Yakovlev, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 97 July (1955); Consultants Bureau Trans. p. 65.				O.B. Nielsen, Kgl. Danske Videnskab. Selskab Mat.-fys. Medd. 30, No. 11 (1955).	
<sup>205</sup> Bi 83 122 14.5 <sup>d</sup>	$\tau$	15 <sup>d</sup>	U(480 - Mev p) chem		$\gamma$ (Tl <sup>208</sup> )	(0.040) $\alpha_L = 21$ 7 (6.05 $\alpha$ )(0.040 $\gamma$ )( $\theta$ ) $J = 1^-, 4^+, 5^+$ *From $\eta(\pi) = 0.299$ 42; $E2/M1 \leq 5 \times 10^{-5}$ for 0.04 $\gamma$ $J(\text{Bi}^{212}) = 1^-$ ; $J(\text{Tl}^{208}) \neq 6$	scin
						J.W. Horton, Phys. Rev. 101, 717 (1956); 90, 388A (1953).	
<sup>207</sup> Bi 83 124 8.0 <sup>y</sup>	$\gamma$ (Pb <sup>207</sup> )	0.56883 30 1.06343 50 No other $\gamma$ with $E_\gamma = 1.06$ 8 (< 10% of 1.063 $\gamma$ )	sl pe		(6.05 $\alpha$ )(0.040 $\gamma$ ) delay > 0.1 $\mu$ s No Doppler broadening observed	sl $\alpha$ (ce <sub>L1</sub> )	
		A.I. Yavin, F.H. Schmidt, Phys. Rev. 100, 171 (1955).				J. Brude, S.G. Cohen, Phys. Rev. 101, 495 (1956).	
<sup>208</sup> Bi 83 125	$\gamma$	<sup>209</sup> Bi ( $\gamma$ , $\pi$ ) 0.500 20 0.930 30 $\tau = 2.70$ ms 25	$E_\gamma \leq 19.5$ scin	<sup>214</sup> Bi 83 131 20 <sup>m</sup>	$\beta^-$ ~20% ~0.45 22% 1.03 12 29% 1.45 4 (1.45, 2.57 $\beta$ ) $\gamma$ No (3.18 $\beta$ ) $\gamma$	7% 1.72 9 6% 2.57 12 13% 3.18 9	a
		S.H. Vegors, Jr., P. Axel, Phys. Rev. 100, 1238A (1955); verbal report.				R.A. Ricci, G. Trivero, Nuovo Cim. 2, 745 (1955).	



$^{206}_{84}\text{Po}$ $^{122}_{84}\text{Po}$ $^{122}_{84}\text{Po}$ $^{122}_{84}\text{Po}$	$\epsilon/\alpha = 95/5$ F.F.Momyer, Jr., E.K.Hyde, J. Inorg. Nucl. Chem. 1, 274 (1955).	$(\text{Rn}^{210} \alpha)/(\text{Po}^{206} \alpha)$ ic $\gamma(\text{Bi}^{208})$ $3^+ \quad 0.285$ $6^+ \quad \sim 0.60$ double (K x ray) (0.285, $\sim 0.60 \gamma$ ) (0.285 $\gamma$ ) (both 0.60 $\gamma$ 's) Source $\sim 99\%$ $\text{Po}^{208}$ from $(\text{Po}^{208} \alpha)/(\text{Po}^{209} \alpha)$ $\dagger$ Photons per $10^5 \alpha$ 's I. Perlman, F. Asaro, F.S. Stephens, J.P. Hummel, R.C. Pilger, UCRL-2932, p 59 (1955); priv. comm.	$\text{Rn}^{209}$ $^{123}_{86}\text{Rn}$ $^{123}_{86}\text{Rn}$ $^{123}_{86}\text{Rn}$	$\tau$ $\epsilon$ $\alpha$ $p \ 5.5^h \text{At}^{209}$ (5.65 $\alpha$ observed) $\dagger$ Used $\epsilon(\text{At}^{209})/\alpha(\text{At}^{209}) = 95/5$	$30^m \ 2$ $\text{Th}^{232}$ (340-Mev p) chem $(\text{At}^{209} \alpha^*)/(\text{Rn}^{209} \alpha)$ ic $17\% \ 6.02 \ 2$ $\alpha$ $6.037 \ 10$ $\alpha$ $6.037 \ 3$ $16^h \ 1$ $74\%$ $\gamma(\text{At}^{211})^*$ $0.030$ $0.246$ $0.430$ $0.890$ $26\%$ $5.82 \ 2$ $p \ 7.5^h \text{At}^{211}$ chem $\dagger$ Used $\epsilon(\text{At}^{211})/\alpha(\text{At}^{211}) = 60/40$ $5.613 \ 7$ $5.779 \ 3$ $5.947 \ 2$ $0.0688^{\S}$ $0.169^*$ $0.231^*$ $6.262 \ 5$
$^{208}_{84}\text{Po}$ $^{124}_{84}\text{Po}$ $^{124}_{84}\text{Po}$ $^{124}_{84}\text{Po}$	$\gamma(\text{Bi}^{208})$ $3^+ \quad 0.285$ $6^+ \quad \sim 0.60$ double (K x ray) (0.285, $\sim 0.60 \gamma$ ) (0.285 $\gamma$ ) (both 0.60 $\gamma$ 's) Source $\sim 99\%$ $\text{Po}^{208}$ from $(\text{Po}^{208} \alpha)/(\text{Po}^{209} \alpha)$ $\dagger$ Photons per $10^5 \alpha$ 's I. Perlman, F. Asaro, F.S. Stephens, J.P. Hummel, R.C. Pilger, UCRL-2932, p 59 (1955); priv. comm.	$\text{Bi}^{209}$ (d,3n) chem scin $\alpha_k = 0.75$ $\alpha_k = 0.021$ $\alpha(0.260 \gamma)$ (K x ray) (0.910 $\gamma$ ) $\epsilon_{\text{LM}}/\epsilon_K \sim 0.2$ All $\epsilon$ to 0.910 level of $\text{Bi}^{209}$ x $\gamma/x$ Source 85% $\text{Po}^{209}$ from $(\text{Po}^{209} \alpha)/(\text{Po}^{208} \alpha)$ $\dagger$ Photons per $10^4 \alpha$ 's I. Perlman, F. Asaro, F.S. Stephens, J.P. Hummel, R.C. Pilger, UCRL-2932, p 59 (1955); priv. comm.	$\text{Rn}^{209}$ $^{123}_{86}\text{Rn}$ $^{123}_{86}\text{Rn}$ $^{123}_{86}\text{Rn}$	$\tau$ $\epsilon$ $\alpha$ $p \ 9^d \text{Po}^{206}$ (5.22 $\alpha$ observed)	$\text{Th}^{232}$ (340-Mev p) chem $(\text{Po}^{210} \alpha)/(\text{Rn}^{210} \alpha)$ ic $\sim 4\%$ $\sim 96\%$ $6.02 \ 2$ $6.037 \ 10$ $6.037 \ 3$ $16^h \ 1$ $74\%$ $\gamma(\text{At}^{211})^*$ $0.030$ $0.246$ $0.430$ $0.890$ $26\%$ $5.82 \ 2$ $p \ 7.5^h \text{At}^{211}$ chem $\dagger$ Used $\epsilon(\text{At}^{211})/\alpha(\text{At}^{211}) = 60/40$ $5.613 \ 7$ $5.779 \ 3$ $5.947 \ 2$ $0.0688^{\S}$ $0.169^*$ $0.231^*$ $6.262 \ 5$
$^{209}_{84}\text{Po}$ $^{125}_{84}\text{Po}$ $^{125}_{84}\text{Po}$ $^{125}_{84}\text{Po}$	$\text{ground state}$ $1/2$ K.L.Vander Sluis, P.M.Griffin, J. Opt. Soc. Am. 45, 1087 (1955).	$\text{Bi}^{209}$ (d,2n) chem scin $\alpha_k = 0.75$ $\alpha_k = 0.021$ $\alpha(0.260 \gamma)$ (K x ray) (0.910 $\gamma$ ) $\epsilon_{\text{LM}}/\epsilon_K \sim 0.2$ All $\epsilon$ to 0.910 level of $\text{Bi}^{209}$ x $\gamma/x$ Source 85% $\text{Po}^{209}$ from $(\text{Po}^{209} \alpha)/(\text{Po}^{208} \alpha)$ $\dagger$ Photons per $10^4 \alpha$ 's I. Perlman, F. Asaro, F.S. Stephens, J.P. Hummel, R.C. Pilger, UCRL-2932, p 59 (1955); priv. comm.	$\text{Rn}^{210}$ $^{124}_{86}\text{Rn}$ $^{124}_{86}\text{Rn}$ $^{124}_{86}\text{Rn}$	$\tau$ $\epsilon$ $\alpha$ $p \ 9^d \text{Po}^{206}$ (5.22 $\alpha$ observed)	$\text{Th}^{232}$ (340-Mev p) chem $(\text{Po}^{210} \alpha)/(\text{Rn}^{210} \alpha)$ ic $\sim 4\%$ $\sim 96\%$ $6.02 \ 2$ $6.037 \ 10$ $6.037 \ 3$ $16^h \ 1$ $74\%$ $\gamma(\text{At}^{211})^*$ $0.030$ $0.246$ $0.430$ $0.890$ $26\%$ $5.82 \ 2$ $p \ 7.5^h \text{At}^{211}$ chem $\dagger$ Used $\epsilon(\text{At}^{211})/\alpha(\text{At}^{211}) = 60/40$ $5.613 \ 7$ $5.779 \ 3$ $5.947 \ 2$ $0.0688^{\S}$ $0.169^*$ $0.231^*$ $6.262 \ 5$
$^{209}_{84}\text{Po}$ $^{125}_{84}\text{Po}$ $^{125}_{84}\text{Po}$ $^{125}_{84}\text{Po}$	$\gamma(\text{Pb}^{205})$ $40^+ \quad 0.260$ $\gamma(\text{Bi}^{209})$ $50^+ \quad 0.910$ $\alpha(0.260 \gamma)$ (K x ray) (0.910 $\gamma$ ) $\epsilon_{\text{LM}}/\epsilon_K \sim 0.2$ All $\epsilon$ to 0.910 level of $\text{Bi}^{209}$ x $\gamma/x$ Source 85% $\text{Po}^{209}$ from $(\text{Po}^{209} \alpha)/(\text{Po}^{208} \alpha)$ $\dagger$ Photons per $10^4 \alpha$ 's I. Perlman, F. Asaro, F.S. Stephens, J.P. Hummel, R.C. Pilger, UCRL-2932, p 59 (1955); priv. comm.	$\text{Bi}^{209}$ (d,2n) chem scin $\alpha_k = 0.75$ $\alpha_k = 0.021$ $\alpha(0.260 \gamma)$ (K x ray) (0.910 $\gamma$ ) $\epsilon_{\text{LM}}/\epsilon_K \sim 0.2$ All $\epsilon$ to 0.910 level of $\text{Bi}^{209}$ x $\gamma/x$ Source 85% $\text{Po}^{209}$ from $(\text{Po}^{209} \alpha)/(\text{Po}^{208} \alpha)$ $\dagger$ Photons per $10^4 \alpha$ 's I. Perlman, F. Asaro, F.S. Stephens, J.P. Hummel, R.C. Pilger, UCRL-2932, p 59 (1955); priv. comm.	$\text{Rn}^{211}$ $^{125}_{86}\text{Rn}$ $^{125}_{86}\text{Rn}$ $^{125}_{86}\text{Rn}$	$\tau$ $\epsilon$ $\alpha$ $p \ 7.5^h \text{At}^{211}$ chem $\dagger$ Used $\epsilon(\text{At}^{211})/\alpha(\text{At}^{211}) = 60/40$	$\text{Th}^{232}$ (340-Mev p) chem $(\text{Po}^{211} \alpha)/(\text{Rn}^{211} \alpha + \text{At}^{211} \alpha^{\S})$ ic $\gamma(\text{At}^{211})^*$ $0.030$ $0.246$ $0.430$ $0.890$ $26\%$ $5.82 \ 2$ $p \ 7.5^h \text{At}^{211}$ chem $\dagger$ Used $\epsilon(\text{At}^{211})/\alpha(\text{At}^{211}) = 60/40$ $5.613 \ 7$ $5.779 \ 3$ $5.947 \ 2$ $0.0688^{\S}$ $0.169^*$ $0.231^*$ $6.262 \ 5$
$^{208,9}_{84}\text{Po}$ $^{125}_{84}\text{Po}$ $^{125}_{84}\text{Po}$ $^{125}_{84}\text{Po}$	$\gamma(?) \sim 70^+ \quad 0.270$ $\sim 70^+ \quad 0.570$ $75^+ \quad 0.865$ (0.270 $\gamma$ ) (0.570 $\gamma$ ) 0.865 $\gamma$ is not crossover $\Sigma$ scin Source 14.5% $\text{Po}^{209}$ (band spectrum measurement) $\dagger$ Photons per $10^4 \alpha$ 's E.H.Daggett, G.R.Grove, Phys. Rev. 99, 1 (1955); 95, 627A (1954).	$\text{Bi}^{209}$ (20-Mev p) scin $\alpha_k = 0.75$ $\alpha_k = 0.021$ $\alpha(0.260 \gamma)$ (K x ray) (0.910 $\gamma$ ) $\epsilon_{\text{LM}}/\epsilon_K \sim 0.2$ All $\epsilon$ to 0.910 level of $\text{Bi}^{209}$ x $\gamma/x$ Source 85% $\text{Po}^{209}$ from $(\text{Po}^{209} \alpha)/(\text{Po}^{208} \alpha)$ $\dagger$ Photons per $10^4 \alpha$ 's I. Perlman, F. Asaro, F.S. Stephens, J.P. Hummel, R.C. Pilger, UCRL-2932, p 59 (1955); priv. comm.	$\text{Rn}^{211}$ $^{125}_{86}\text{Rn}$ $^{125}_{86}\text{Rn}$ $^{125}_{86}\text{Rn}$	$\tau$ $\epsilon$ $\alpha$ $p \ 7.5^h \text{At}^{211}$ chem $\dagger$ Used $\epsilon(\text{At}^{211})/\alpha(\text{At}^{211}) = 60/40$	$\text{Th}^{232}$ (340-Mev p) chem $(\text{Po}^{211} \alpha)/(\text{Rn}^{211} \alpha + \text{At}^{211} \alpha^{\S})$ ic $\gamma(\text{At}^{211})^*$ $0.030$ $0.246$ $0.430$ $0.890$ $26\%$ $5.82 \ 2$ $p \ 7.5^h \text{At}^{211}$ chem $\dagger$ Used $\epsilon(\text{At}^{211})/\alpha(\text{At}^{211}) = 60/40$ $5.613 \ 7$ $5.779 \ 3$ $5.947 \ 2$ $0.0688^{\S}$ $0.169^*$ $0.231^*$ $6.262 \ 5$
$^{208}_{86}\text{Rn}$ $^{122}_{86}\text{Rn}$ $^{122}_{86}\text{Rn}$ $^{122}_{86}\text{Rn}$	$\tau$ $\epsilon$ $\alpha$ $p \ 3.8^h \text{Po}^{204}$ (5.37 $\alpha$ observed) F.F.Momyer, Jr., E.K.Hyde, J. Inorg. Nucl. Chem. 1, 274 (1955).	$23^m \ 2$ $\text{Th}^{232}$ (340-Mev p) chem $(\text{Po}^{208} \alpha)/(\text{Rn}^{208} \alpha)$ ic $\sim 80\%$ $\sim 20\%$ $6.14 \ 2$ $\alpha$ $6.141 \ 4$	$\text{Rn}^{209}$ $^{123}_{86}\text{Rn}$ $^{123}_{86}\text{Rn}$ $^{123}_{86}\text{Rn}$	$\tau$ $\epsilon$ $\alpha$ $p \ 3.8^h \text{Po}^{204}$ (5.37 $\alpha$ observed)	$\text{Th}^{232}$ (340-Mev p) chem $(\text{Po}^{208} \alpha)/(\text{Rn}^{208} \alpha)$ ic $\sim 80\%$ $\sim 20\%$ $6.14 \ 2$ $\alpha$ $6.141 \ 4$
$^{208}_{86}\text{Rn}$ $^{122}_{86}\text{Rn}$ $^{122}_{86}\text{Rn}$ $^{122}_{86}\text{Rn}$	$\tau$ $\epsilon$ $\alpha$ $p \ 3.8^h \text{Po}^{204}$ (5.37 $\alpha$ observed) F.F.Momyer, Jr., E.K.Hyde, J. Inorg. Nucl. Chem. 1, 274 (1955).	$23^m \ 2$ $\text{Th}^{232}$ (340-Mev p) chem $(\text{Po}^{208} \alpha)/(\text{Rn}^{208} \alpha)$ ic $\sim 80\%$ $\sim 20\%$ $6.14 \ 2$ $\alpha$ $6.141 \ 4$	$\text{Rn}^{212}$ $^{126}_{86}\text{Rn}$ $^{126}_{86}\text{Rn}$ $^{126}_{86}\text{Rn}$	$\tau$ $\epsilon$ $\alpha$ $p \ 3.8^h \text{Po}^{204}$ (5.37 $\alpha$ observed)	$\text{Th}^{232}$ (340-Mev p) chem $(\text{Po}^{208} \alpha)/(\text{Rn}^{208} \alpha)$ ic $\sim 80\%$ $\sim 20\%$ $6.14 \ 2$ $\alpha$ $6.141 \ 4$

$\text{Rn}^{220}$   $\tau$  51.5<sup>s</sup> 10 d  $\text{Th}^{232}$  chem  
86 134  
52<sup>s</sup> H. Schmied, R.W. Fink, B.L. Robinson, J. Inorg. Nucl. Chem. 1, 342 (1955).

$\text{Fr}^{211}$   $\tau$  Not 2<sup>m</sup> to 5<sup>m</sup>\*  $\text{Th}^{232}$ (340-Mev p) chem  
87 124 No Rn daughter observed  
F.F. Momyer, Jr., E.K. Hyde, J. Inorg. Nucl. Chem. 1, 274 (1955); \*Phys. Rev. 86, 805 (1952).

$\text{Fr}^{212}$   $\alpha$  24<sup>†</sup> 6.342 7  $\text{Th}^{232}$ (340-Mev p) chem  
87 125 19<sup>m</sup> 39<sup>†</sup> 6.387 9 s  
37<sup>†</sup> 6.411 9

F.F. Momyer, Jr., F. Asaro, E.K. Hyde, J. Inorg. Nucl. Chem. 1, 267 (1955).

$\text{Ra}^{213}$   $\tau$  2.7<sup>m</sup> 3  $\text{Th}^{232}$ (340-Mev p) chem  
88 125  $\alpha$  6.90 4 ic  
2.7<sup>m</sup> p 30<sup>m</sup>  $\text{Rn}^{209}$  (6.02  $\alpha$  observed)

F.F. Momyer, Jr., E.K. Hyde, J. Inorg. Nucl. Chem. 1, 274 (1955).

$\text{Ac}^{226}$   $\gamma(\text{Th}^{226})$  0.159 scin  
89 137 29<sup>h</sup> 0.232

F.S. Stephens, Jr., F. Asaro, I. Perlman, Phys. Rev. 100, 1543 (1955); J.R. Grover, G.T. Seaborg, ibid.

$\text{Ac}^{227}$   $\beta^-$  0.0455 10 pc  
89 138 22<sup>y</sup> F-K linear ( $E_\beta > 0.007$ )  
No 0.037  $\gamma$ , no ce, no Th L x ray 4 $\pi$  pc  
0.0167 5 and 0.020 1  $\gamma$ 's observed but growth suggests assignment to impurity

W. Beckmann, Z. Phys. 142, 585 (1955).  
Z. Naturf. 10a 86 (1955).

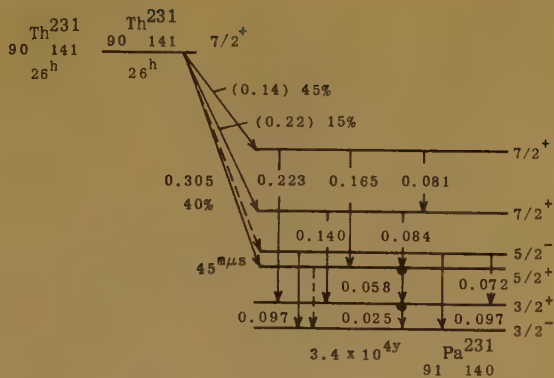
$\text{Th}^{230}$   $\gamma(\text{Ra}^{226})$  -  
90 140 8x10<sup>4y</sup> 590<sup>†</sup> 0.068 scin  
7<sup>†</sup> 0.142  
14<sup>†</sup> 0.184 E1  
17<sup>†</sup> 0.253 E1

E1 assignment from systematics  
†Photons per 10<sup>5</sup>  $\alpha$ 's

F.S. Stephens, Jr., F. Asaro, I. Perlman, Phys. Rev. 100, 1543 (1955).

$\text{Th}^{231}$   $\beta^-$  0.305 10  
90 141 26<sup>h</sup>  $\gamma(\text{Pa}^{231})$  0.0255 s $\pi$  ce, pc,  
0.0585 0.0974 scin  
0.0719 0.140  
0.0812 0.1652  
0.0841 0.223  
(0.305  $\beta$ )(0.084  $\gamma$ ) delay = 45<sup>m</sup>  $\mu$ s 3  
(~0.08  $\gamma$ )(0.0255, 0.0585  $\gamma$ )

Continued



J.P. Mize, J.W. Starnes, Bull. Am. Phys. Soc. 1, No. 4, 171 E6 (1956); verbal report.

$\text{Th}^{232}$   $\gamma(\text{Ra}^{228})$  0.059 1 L/M ~ 3 ppl  $\alpha(\text{ce})$   
90 142 ce/ $\alpha$  = 0.24 3  
1.4x10<sup>10y</sup>

S.W. Peat, M.A.S. Ross, Proc. Phys. Soc. 68A, 923 (1955).

$\tau$  for spontaneous fission > 10<sup>20y</sup> ic  
From 0.002 fissions per hr gm of sample.  
However half of these counts are due to presence of 0.006% U

A.V. Podgurskaya, V.I. Kalashnikova, G.A. Stolyarov, E.D. Vorob'ev, G.N. Flerov, Zhur. Eksptl' i Teoret. Fiz. 28, 503 (1955); AERE Lib/Trans. 569.

$\tau$  for spontaneous fission = 1.4 x 10<sup>18y</sup>  
From 0.15 fissions per hr gm of sample.  
Less than 0.1 of these counts are due to U  
E. Segrè, Phys. Rev. 86, 21 (1952).

$\text{Th}^{232}$  Level  $\text{Th}^{232}(\alpha, \alpha' \gamma)$   $E_\alpha = 3.3$ ; scin  
90 142  $\gamma$  0.050 5  $\tau = 780 \mu\text{s}$  ( $\alpha = 340$ )

A.S. Divatia, R.H. Davis, R.D. Moffat, D.A. Lind, Phys. Rev. 100, 1266A (1955); verbal report.

$\gamma$   $\text{Th}^{232}(\text{p}, \text{p}' \gamma)$   $E_p = 4.8$   
1.1° 0.719 K/L = 3.5 s $\pi$  ce  
\* $\sigma(90^\circ)$  for ce<sub>K</sub> in  $\mu\text{b/sterad}$

M.S. Moore, C.M. Class, F.W. Prosser, Jr., J.P. Schiffer, Bull. Am. Phys. Soc. 1, No. 2, 88, H2 (1956).

$\text{Th}^{234}$   $\beta^-$  35% 0.100 2 s $\pi$   $\beta \gamma$   
90 144 65% (0.191)  
24<sup>d</sup> (0.100  $\beta$ )(0.090  $\gamma$ )

E.F. de Haan, G.J. Sizoo, P. Kramer, Physica 21, 803 (1955); 19, 1201 (1953).

Pa <sup>231</sup>	$\alpha$	1.3%	4.6710 50
91 140		0.8%	4.7040 80 ?
3.4x10 <sup>4y</sup>		10%	4.7270 50
		1.5%	4.8476 50
		24%	4.9420 70
		1.5%	4.9740 60
		26%	5.0060 70
		23%	5.0205 45
		12%	5.0490 30

No  $\alpha$  with  $4.7270 \leq E_{\alpha} \leq 4.8476$  ( $< 0.1\%$ )

L.L.Gol'din, E.F.Tret'yakov, G.I.Novikova,  
Conf. Acad. Sci. USSR on Peaceful Use of  
Atomic Energy, Phys. Math. Sci. p. 226  
July (1955); UCRL Trans. 242.

Pa <sup>234</sup>	$\beta^-$	0.60	Th <sup>234</sup> source; $\pi\pi$ $\beta\gamma$
91 143		1.50	
1.2 <sup>m</sup>	$\gamma(U^{234})$	(0.80)	$\alpha_K = 0.15^\circ$ M2
			*Assuming proposed decay scheme

E.F.deHaan, G.J.Sizoo, P.Kramer, Physica 21,  
803 (1955).

U <sup>233</sup>		ground state	
92 141	J	5/2	S
		$\mu(U^{233})/\mu(U^{235}) = -1.8$	
		$q(U^{233})/q(U^{235}) = +2.0$	
			N.I.Kaliteevskii, M.P.Chaika, Doklady Akad. Nauk SSSR 103, 49 (1955).

		ground state	
J	5/2		S
	$\mu(U^{233})/\mu(U^{235}) \sim -1.5^\circ$		
		*From comparison with published data on same line in U <sup>235</sup> spectrum	

L.A.Korostyleva, A.R.Striganov, N.M.Iashin,  
Zhur. Eksptl' i Teoret. Fiz. 28, 471 (1955);  
Soviet Phys. JETP 1, 310 (1955); Izvest.  
Akad. Nauk. Ser. Fiz. SSSR 19, 31 (1955).

U <sup>233</sup>	$\alpha$	0.03%	4.489 5
92 141		1.6%	4.7174 10
1.6x10 <sup>5y</sup>		14.9%	4.7732 4
		83.5%	4.8157 5

L.L.Gol'din, E.F.Tret'yakov, G.I.Novikova,  
Conf. Acad. Sci. USSR on Peaceful Use of  
Atomic Energy, Phys. Math. Sci. p. 226  
July (1955); UCRL Trans. 242.

$\alpha$ 's emitted preferentially in the direction  
perpendicular to nuclear axis  $\alpha(\theta, T)$   
 $W(\theta) = 1 - 0.06P_2(\cos \theta)$  at  $1.1^\circ K$

J.W.T.Dabbs, L.D.Roberts, G.W.Parker, Bull.  
Am. Phys. Soc. 1, No. 4, 207 R9 (1956).

U <sup>234</sup>	$\alpha$	28%	4.7168 10
92 142		72%	4.7683 10
2.5x10 <sup>5y</sup>			

L.L.Gol'din, E.F.Tret'yakov, G.I.Novikova,  
Conf. Acad. Sci. USSR on Peaceful Use of  
Atomic Energy, Phys. Math. Sci. p. 226  
July (1955); UCRL Trans. 242.

sd	U <sup>234</sup>	Resonances	U <sup>233</sup> (n)	cryst
	92 142	$\sigma_{to}$	$E_o$ (ev)	$\Gamma$ (mev)
		975	1.785	300
		1020	2.290	100
		233	3.635	198
		1015	6.795	187
		680	10.375	294
				270
				70
				168
				157
				264

V.L.Sailor, Phys. Rev. 100, 1249A (1955);  
verbal report.

Resonances	U <sup>233</sup> (n,f)	$E_n = 10^{-3}$ to $10^3$ ev
	1.80 2 ev	5.1
	2.30 2	7
	3.5	12
		cryst

J.M.Auclair, M.Galula, P.Hubert, B.Jacrot,  
R.Joly, F.Netter, G.Vendryes, Geneva Conf.  
8/P/354 (1955).

U <sup>235</sup>	ground state	S
92 143	J	5/2 (7/2?)
	$\mu(U^{233})/\mu(U^{235}) = -1.8$	
	$q(U^{233})/q(U^{235}) = +2.0$	
		N.I.Kaliteevskii, M.P.Chaika, Doklady Akad. Nauk SSSR 103, 49 (1955).

U <sup>235</sup>	(4.40 $\alpha$ )(0.188 $\gamma$ )	scin
92 143		
7.7x10 <sup>8y</sup>		
	P.Huber, K.P.Meyer, E.Würger, Helv. Phys. Acta 28, 326A (1955).	

$\gamma(Th^{231})$	enriched U <sup>235</sup>
$\sim 13^\dagger$	0.146 3
55 $\dagger$	0.188 2
3.7 $\dagger$	0.209 4 ?
0.03 $\dagger$	0.349 4 ?

No other  $\gamma$  with  $0.26 < E_\gamma < 0.45$  ( $< 0.01^\dagger$ )  
 $\dagger$ Photons per 100  $\alpha$ 's

C.W.Malich, Bull. Am. Phys. Soc. 1, No. 1, 43  
K12 (1956).

U <sup>236</sup>	Resonances	U <sup>235</sup> (n,f)	$E_n = 0.005$ to $150$ ev
92 144		$E_o$ (ev)	Peak $\sigma_t$
	-0.01 to 0.01		chopper
		1.12	85
		3.55	98
		6.3	130
		7.0	89
		8.7	840
		12.2	450
		19.5	640
		33.5	960

\*Assuming  $\Gamma = 0.15$  ev

B.T.Price, J.Nuclear Energy 2, 128 (1955).



$^{236}_{92}\text{U}$	Resonances	$^{235}\text{U}(n, f)$	$E_n = 10^{-3}$ to 200 eV	$^{237}_{92}\text{U}$	$\gamma(^{237}\text{Np})$			
144		0.29	6.8	145	0.026	0.165	sd	ce
		1.1	9	6.75 <sup>d</sup>	0.033	0.193 ?		
		3.4	14		0.043	0.208		
					0.060	0.268		
					0.069 ?	0.330		
					0.101	0.370		
					0.124 ?	0.433		

J.M. Auclair, M. Galula, P. Hubert, B. Jacrot, R. Joly, F. Netter, G. Vendryes, Geneva Conf. 8/P/354 (1955).

S.A. Baranov, K.N. Shlyagin, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 251 July (1955); Consultants Bureau Trans. p. 183.

Resonances	$^{235}\text{U}(n, f)$	pulsed n's
$\sigma_{fo}^*$	$E_o(\text{ev})$	$\sigma_f/\Gamma_f$
1278	8.8	110
100	11.7	7.4
624	12.34	43.7
1479	19.3	103.5

\*From  $\sigma_f/\sigma_t/\Gamma$  and  $\sigma_{fo}$

M.L. Yeater, W.R. Mills, D.E. McMillan, E.R. Gaertner, Bull. Am. Phys. Soc. 1, No. 1, 8, A5 (1956); verbal report.

$^{238}_{92}\text{U}$	Level	$^{238}\text{U}(\alpha, \alpha'\gamma)$	$E_\alpha = 3.3$ ; scin
146	$\gamma$	0.045 3	$\tau = 440 \mu\text{s}$ ( $\alpha = 700$ )

A.S. Divatia, R.H. Davis, R.D. Moffat, D.A. Lind, Phys. Rev. 100, 1266A (1955); verbal report.

Resonances	$^{235}\text{U}(n)$	chopper
$E_o(\text{ev})$	$2g\Gamma_n(\text{mev})^\S$	$E_o(\text{ev})$
9.25 5	0.054 16	25.9 4
9.70 5	0.022 6	26.8 4
10.13 5	0.017 6	28.0 4
10.40 5	0.004 8	28.6 4
10.80 5	0.006 12	29.9 5
11.6 1	0.171 15	31.1 5
12.4 1	0.396 23	32.3 5
12.8 1	0.014 4	33.8 5
13.3 1	0.030 4	34.7 6
14.1 1	0.092 11	35.3 6
14.7 1	0.032 4	38.4 7
15.5 1	0.054 3	39.7 7
16.2 1	0.087 5	42.0 7
16.8 2	0.055 5	43.7 8
18.2 2	0.079 3	44.8 8
19.5 2	0.63 4	47.1 8
20.3 2	0.008 3	48.6 9
21.2 2	0.28 6	51.6 9
23.2 3	0.13 2	55.4 10
23.7 3	0.31 2	56.4 10
24.5 3	0.13 2	58.3 10
25.6 3	0.12 3	61.0 11

$^{235}\text{U}(n, f)$			
$E_o(\text{ev})$	$\Gamma_f(\text{mev})^\S$	$E_o(\text{ev})$	$\Gamma_f(\text{mev})^\S$
11.6 1	9 11	23.7 3	104 81
12.4 1	16 12	34.7 6	48 27
16.2 1	12 17	35.3 6	82 33
19.5 2	79 22		

\*Double?

$^\S$ Based on  $\bar{\Gamma}_\gamma = 30 \text{ mev}$ ,  $\bar{\Gamma}_n = \Gamma_n/[E_o(\text{in ev})]^{1/2}$ .

O.D. Simpson, R.G. Fluharty, F.B. Simpson, R.M. Brugger, Phys. Rev. 100, 1249A (1955); verbal report.

Level	$^{238}\text{U}(n, n')$	$E_n = 2.45$
	1.18 8	pulsed n's

L. Cranberg, J.S. Levin, Bull. Am. Phys. Soc. 1, No. 1, 56, R10 (1956); verbal report.

$^{234}_{93}\text{Np}$	$\gamma(^{234}\text{U})$	$L_2/L_3 = 1.4$	sl ce, scin
141	0.043		
4.4 <sup>h</sup>	0.099 ?		
	0.109	0.740*	
	0.151	0.752	
	0.234	0.780*	
	0.247	0.810	
	0.449	0.940*	
	0.486	1.010*	
	0.502*	1.200*	
	0.516	1.565	

(0.502  $\gamma$ )(0.449, 0.740, 1.010  $\gamma$ ) scin

(0.740  $\gamma$ )(0.449, 0.780  $\gamma$ )

(0.940  $\gamma$ )(0.502, 0.585  $\gamma$ ) \*scin only

J.R. Huizenga, D.W. Engelkemeir, M.S. Freedman, P.T. Porter, J.T. Gindler, Bull. Am. Phys. Soc. 1, No. 4, 171 E7 (1956); verbal report.

$^{237}_{93}\text{Np}$	$\alpha$				
144	0.02%	4.52	33%	4.767	ic
2.2x10 <sup>6y</sup>	0.5%	4.589	49%	4.787	
	6.0%	4.644	3%	4.816	
	3%	4.674	3%	4.872	
	2%	4.713			

$\gamma(^{233}\text{Pa})$  scin, pc, s ce

< 3†	0.020	$\alpha > 10$
16†	0.029	$\alpha_L = 2.8$
< 1†	0.0568	$\alpha_L > 44$
16†	0.0869	$\alpha_L = 0.75$
1†	0.145	$\alpha_L = 0.15$
0.1†	0.175	
0.3†	0.200	

x(Pa) 130† L x ray  
5† K x ray

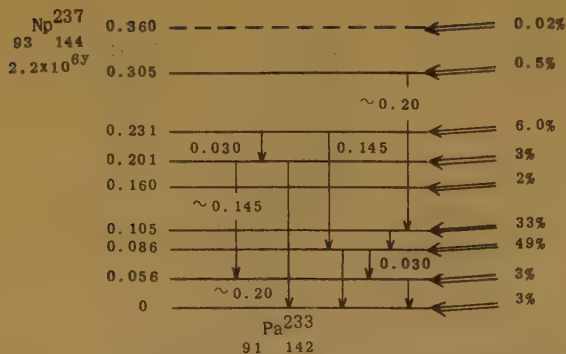
†Photons per 100  $\alpha$ 's

Level scheme supported by  $\alpha\gamma$ ,  $\gamma\gamma$ ,  $\alpha(\text{ce})$

Continued

Continued

$^{237}_{92}\text{U}$	$\beta^-$		$^{236}\text{U}(n, \gamma)$ chem; sd
145	26%	0.084	
6.75 <sup>d</sup>	74%	0.249	



L.B. Magnussøn, D.W. Engelkemeir, M.S. Freedman, P.T. Porter, F. Wagner, Jr., Phys. Rev. 100, 1237A (1955); verbal report.

$\alpha$ 's emitted preferentially in the direction perpendicular to nuclear axis  $\alpha(\theta, T)$   
 $W(\theta) = 1 - 0.07 P_2(\cos \theta)$  at 1.1°K

L.D. Roberts, J.W.T. Dabbs, G.W. Parker, R.D. Ellison, Bull. Am. Phys. Soc. 1, No. 4, 207 R8 (1956).

$\text{Np}^{239}$   $\gamma(\text{Pu}^{239})$   $\text{U}^{(238)}(n, \gamma\beta)$  chem  
 93 146 16† 0.44 4 $\pi$  ic, scin  
 2.3<sup>d</sup> 19† 0.49  
 †Photons per 10<sup>5</sup>  $\beta$ 's

H.W. Lefevre, E.M. Kinderman, H.H. Van Tuyl, Phys. Rev. 100, 1374 (1955).

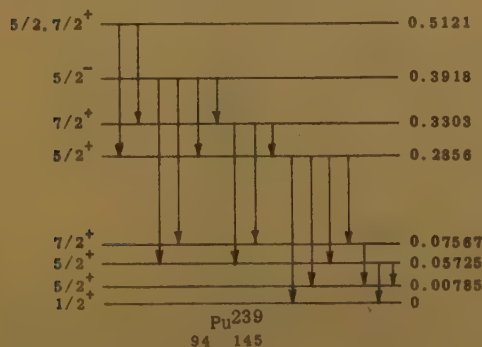
$\text{Np}^{240}$   $\gamma(\text{Pu}^{240})$   $\text{Np}^{239}(n, \gamma)$  chem  
 93 147 72† 0.88 scin  
 1<sup>h</sup> 100† 0.97  
 s. a. 9† 1.14

H.W. Lefevre, E.M. Kinderman, H.H. Van Tuyl, Bull. Am. Phys. Soc. 1, No. 1, 62 UA6 (1956); verbal report.

$\text{Np}^{240}$  Not p 1<sup>h</sup>  $\text{Np}^{240}$  (< 5%)  
 93 147 7.3<sup>m</sup> H.W. Lefevre, E.M. Kinderman, H.H. Van Tuyl, Bull. Am. Phys. Soc. 1, No. 1, 62 UA6 (1956).

$\text{Np}^{239}$   $\gamma(\text{Pu}^{239})$   $\text{U}^{238}(\text{pile } n, \gamma\beta)$  chem  
 93 146 ~300° 0.04464 M1/E2 = 4 s  $\pi$  ce  
 2.3<sup>d</sup> 475° 0.04940 M1/E2 = 2.4  
 1275° 0.05725 M1/E2 < 0.05  
 ~10° 0.0614 E1 (ce<sub>L1</sub> only)  
 800° 0.06782 E2  
 0.09832  
 0.1033  
 500° 0.10610 E1  
 0.1064  
 0.1253  
 0.1818  
 700° 0.2099 M1/E2 2.4  
 0.2264  
 1980° 0.2284 M1/E2 > 4  
 0.2546  
 0.2731  
 1400° 0.2777 M1/E2 > 9  
 0.2856  
 0.3161  
 0.3345

Multipole mixtures from  $L_1 : L_2 : L_3$   
 \*Relative ce intensity (assuming  $L/\text{MN} = 3$ )



J.M. Hollander, W.G. Smith, J.W. Mihelich, Phys. Rev. 100, 1238A (1955); verbal report.

$\text{Pu}^{238}$   $\alpha$  31% 5.4499 7 sd  
 94 144 69% 5.4909 5  
 90<sup>y</sup>

L.L. Gol'din, E.F. Tret'yakov, G.I. Novikova, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 226 July (1955); UCRL Trans. 242.

$\text{Pu}^{239}$  155 tracks (range 100 to 300  $\mu$ ) observed in  
 94 145 ppl from  $\text{Pu}^{239}$  source. Similiar tracks seen with active deposit of Po, Ac, and Th  
 M. Ader, Compt. rend. 241, 1748 (1955).

$\text{Pu}^{239}$  ground state  
 94 145 J 1/2 S

L.A. Korostyleva, A.R. Striganov, N.M. Iashin, Zhur. Eksptl' i Teoret. Fiz. 28, 471 (1955); Soviet Phys. JETP 1, 310 (1955); Izvest. Akad. Nauk Ser. Fiz. SSSR 19, 31 (1955).

N.I. Kaliteevskii, M.P. Chaika, Doklady Akad. Nauk SSSR 103, 49 (1955).

$\text{Pu}^{239}$   $\alpha$  10.7% 5.0963 3 sd  
 94 145 16.8% 5.1344 3  
 2.4x10<sup>4y</sup> 72.5% 5.1474 2  
 $\gamma(\text{U}^{235})^*$  0.0125 sd ce  
 0.0383  
 0.0508

No other  $\alpha$ 's from 4.9 to 5.33 (< 0.2%)

L.L. Gol'din, E.F. Tret'yakov, G.I. Novikova, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 226 July (1955); UCRL Trans. 242. \*K.N. Shlyagin, ibid.

J.P. Butler, T.A. Eastwood, T.L. Collins, M.E. Jones, F.M. Rourke, R.P. Schuman, Bull. Am. Phys. Soc. 1, No. 4, 187 K4 (1956).

Yu.G. Abov, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 249 July (1955); Consultants Bureau Trans. p. 209.

$\gamma(\text{U}^{236})^*$  0.0446 sd ce  
No other  $\alpha$  ( $< 0.6\%$ )

L. L. Gol'din, E. F. Tret'yakov, G. I. Novikova,  
Conf. Acad. Sci. USSR on Peaceful Use of  
Atomic Energy, Phys. Math. Sci. p. 226  
July (1955); UCRL Trans. 242. \*K. N. Shlyagin,  
ibid.

$\text{Pu}^{242} \tau$   $3.79 \times 10^{5y} \gamma$   $\text{Pu}(\text{pile n})$   
 $94 \quad 148$  specific activity

J.P. Butler, T.A. Eastwood, T.L. Collins, M.E. Jones, F.M. Rourke, R.P. Schuman, Bull. Am. Phys. Soc. 1, No. 4, 187 K4 (1956).

$$\begin{array}{l} \text{Pu}^{239}(n, f) \quad E_n = 10^{-3} \text{ to } 100 \text{ ev} \\ 0.297 \pm 0.003 \quad \Gamma = 0.09 \pm 0.01 \quad \text{cryst} \\ \sigma_0 = 3000 \end{array}$$

J.M.Auclair, M.Galula, P.Hubert, B.Jacrot,  
R.Joly, F.Netter, G.Vendryes, Geneva Conf.  
8/P/354 (1955).

$\text{Pu}^{242}_{94\ 148}$	Resonances	$\text{Pu}^{241}(n, f)$	$E_n = 0.01$ to 9 ev
		<b>0.255</b> 20	$\Gamma = 103\ 20$ mev cryst,
			$\sigma_o = 1420\ 150$ chopper
		<b>4.45</b> 10	$\Gamma = 470$ mev (double?)
		<b>5 to 7.5</b>	3 resonances

R. Richmond, B. T. Price, J. Nuclear Energy 2.  
177 (1956).

Resonance	$\text{Pu}^{239}(n)$	cryst
0.300 5 ev	$\Gamma = 105.5 \text{ meV}$	
	$\sigma_0 = 4600 \pm 300$	

$\text{Pu}^{244}$   
 $94 \quad 150 \quad \tau$   
 $8 \times 10^{7y}$

$7.6 \times 10^{7y} \quad 20$

Pu(pile n) chem;ms  
 counted  $7.3 \text{ mNp}^{240}$

H. Diamond, R. Barnes, Phys. Rev. 101, 1064 (1956).

N. Galanina, K. Ignatyev, S. Nikitin, S. Sukhoruchkin, quoted by Yu. G. Abov, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 249 July (1955); Consultants Bureau Trans. p. 209.

$\tau \sim 8 \times 10^7 \text{ y}$  Pu (pile n) chem; ms  
counted  $14^h \text{U}^{240}$

J.P.Butler, T.A.Eastwood, T.L.Collins, M.E.  
Jones, F.M.Rourke, R.P.Schuman. Bull. Am.  
Phys. Soc. 1, No. 4, 187 K4 (1956).

Resonances	$\text{Pu}^{239}(\text{n}, \text{f}) \quad E_n = 0.007 \text{ to } 700 \text{ ev}$ $0.297 \text{ ev} \quad \Gamma = 98.3 \text{ mev} \quad \text{cryst.}$ $\sigma_o = 2940 \text{ } 100 \text{ } \text{chopper}$			
	$E_o(\text{ev})$	$\sigma_o^*$	$E_o(\text{ev})$	$\sigma_o^*$
	8.0 2	840	13.3 5	750
	11.2 3	1930	22.8 7	1030
	15.1 4	1530	26.8 9	490

\* Assuming  $\Gamma = 100$  mev

$$\tau \text{ for spontaneous fission} = 2.5 \times 10^{10} \text{ y}$$

P. R. Fields, J. E. Gindler, A. L. Harkness, M. H. Studier, J. R. Huizenga, A. M. Friedman, Phys. Rev. 100, 172 (1955).

R. Richmond, B.T. Price, J. Nuclear Energy 2, 177 (1956).

Resonances	$\text{Pu}^{239}(n, f)$	
	0.3 eV	
	7.8	17.6
	11.0	22.2
	11.9	42
	14.3	44.5
	14.7	50
	15.3	53

$\text{Pu}^{245} \tau$   $10.1^h$  5  $\text{Pu}^{244}$  (pile n,  $\gamma$ )  
 $94 \ 151$   $10^h$  p  $25^m$  Am chem

P. R. Fields, M. H. Studier, A. M. Friedman, H. Diamond, R. Sjöblom, P. A. Sellers, J. Inorg. Nucl. Chem. 1, 262 (1955).

$\tau$   $12^h$   $1$   $\text{Pu}^{239}(\text{pile n})$  chem

R.E.Coté, L.M.Bollinger, J.M.LeBlanc, G.E. Thomas, Bull. Am. Phys. Soc. 1, No. 4, 187 K5 (1956).

C. I. Browne, D. C. Hoffman, W. T. Crane, J. P. Balagna, G. H. Higgins, J. W. Barnes, R. W. Hoff, H. L. Smith, J. P. Mize, M. E. Bunker, J. Inorg. Nucl. Chem. 1, 254 (1955).



$\text{Pu}^{246}$ 94 152 11 <sup>d</sup>	$\tau$	11.2 <sup>d</sup> 2	H-bomb debris, chem; ms
	$\beta^-$	0.15	a
	$\gamma(\text{Am}^{246})$	0.043	0.175 scin
		0.111 3	0.224 10
	p	25 <sup>m</sup> Am chem	

D.Engelkemeir, P.R.Fields, S.Fried, G.L.Pyle, C.M.Stevens, L.B.Asprey, C.I.Browne, H.L.Smith, R.W.Spence, J.Inorg. Nuclear Chem. 1, 345 (1955).

$\text{Am}^{239}$ 95 144 12 <sup>h</sup>	$\alpha$	0.003%*	$\text{Pu}^{239}$ (18-Mev d,2n)
	$\gamma(\text{Np}^{235})$	5†	0.0483 15 E1 pc
	$\alpha(0.048\gamma)$		
	†Photons per 10 $\alpha$ 's		

F.Asaro, F.S.Stephens,Jr., W.M.Gibson, R.A.Glass, I.Perlman, Phys. Rev. 100, 1541 (1955); \*G.H.Higgins, ibid.

$\text{Am}^{241}$ 95 146 470 <sup>y</sup>	$\alpha$	0.002%	5.241 5 ?	sd
		0.015%	5.321 3	
		1.66%	5.3860 5	
		18.8%	5.4391 6	
		85%	5.4820 6	
		0.24%	5.5082 5	
		0.39%	5.5408 6	

L.L.Gol'din, E.F.Tret'yakov, G.I.Novikova, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 226 July (1955); UCRL Trans. 242.

$\gamma(\text{Np}^{237})$		$L_1 : L_2 : L_3$		d $\text{Pu}^{241}$ ; sd ce
85°	0.02638	9 20 13	E1	
119°	0.03322	51 12 12	M1 + (E2?)	
137°	0.04343	40 33 26	E2 + M1	
10°	0.05552	4 3		
350°	0.05962	73 155 33	E2/M1 = 9	
	0.09880			

\*Relative ce intensities

S.A.Baranov, K.N.Shlyagin, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 251 July (1955); Consultants Bureau Trans. p. 183.

$\gamma(\text{Np}^{237})$			scin
27†	(0.0264)	370†	(0.0596)
~0.6†	(0.0434)	0.2†	(0.0988)
x	370†	L x ray	
†Photons per 10 <sup>3</sup> $\alpha$ 's			

L.B.Magnusson, D.W.Engelkemeir, Bull. Am. Phys. Soc. 1, No. 4, 171 E8 (1956); verbal report.

$\text{Am}^{242}$ 95 147 100 <sup>y</sup> g.s.	$\beta^-$	90%	0.585 10	$\text{Am}^{241}$ (n, $\gamma$ ) chem; sd
	$\epsilon_K$	10%		scin Pu K x ray
	No ce observed			sd ce
	45±10% of $\beta$ 's to 0.042 $\text{Cm}^{242}$ level from			
	$\beta(\text{L x ray})/\beta$			

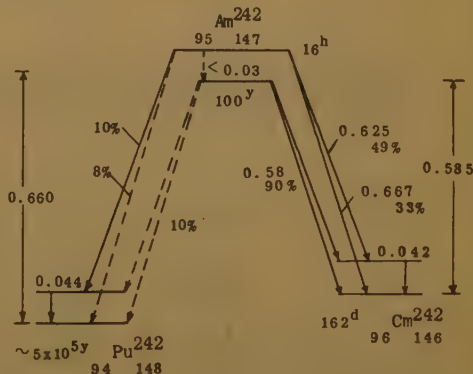
R.W.Hoff, H.Jaffe, T.O.Passell, F.S.Stephens, E.K.Hulet, S.G.Thompson, Phys. Rev. 100, 1403 (1955).

$\text{Am}^{242}$ 95 147 16 <sup>h</sup>	$\tau$	16 <sup>h</sup>	$\text{Am}^{241}$ (n, $\gamma$ ) chem
	$\beta^-$	~49%	0.625 5 $\Delta J=2$ , yes shape sd
		~33%	0.667 5 F-K assumed linear
	$\epsilon$	(~18%)	pc Pu K $\alpha$ , K $\beta$ x rays
	$\gamma(\text{Cm}^{242})$		$L_2 : L_3 : M : N$ sd ce
		559°	0.0422 222:163:120:54 E2
	$\gamma(\text{Am}^{242})$	<50°	0.0451
	$\gamma(\text{Pu}^{242})$	128°	0.0445 69:34:18:7 E2
	*ce per 1000 $\beta^-$		

S.A.Baranov, K.N.Shlyagin, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 251 July (1955); Consultants Bureau Trans. p. 183.

$\beta^-$	81% <sup>§</sup>	0.620 10	$\text{Am}^{241}$ (n, $\gamma$ ) chem; sd
$\epsilon$	19% <sup>§</sup>		$\text{Pu}^{242}/\text{Cm}^{242}$
$\gamma(\text{Cm}^{242})$			sd ce
	100°	0.0422 3**	$L_2/L_3 = 1.4$ 4 E2
$\gamma(\text{Pu}^{242})$	40°	0.0446 3**	$L_2/L_3 = 1.4$ 4 E2
No IT (<6% from L x ray intensities)			cryst
No IT $\gamma$ with $E_\gamma > 0.030$			sd ce
51±5% of $\beta$ 's to 0.042 $\text{Cm}^{242}$ level from			
$\beta(\text{L x ray})/\beta$			
*Relative ce <sub>L</sub> intensities			

R.W.Hoff, H.Jaffe, T.O.Passell, F.S.Stephens, E.K.Hulet, S.G.Thompson, Phys. Rev. 100, 1403 (1955); §G.H.Higgins, S.G.Thompson, ibid.; \*\*E.L.Church, ibid.



$\text{Am}^{244}$ 95 149 26 <sup>m</sup>	$\epsilon/\beta^- = 3.9 \times 10^{-4}$	$\text{Am}^{243}$ (pile n, $\gamma$ ) chem; ms
	From $\text{Pu}^{244}$ , $\text{Cm}^{244}$ yield	

P.R.Fields, J.E.Gindler, A.L.Harkness, M.H.Studier, J.R.Huizenga, A.M.Friedman, Phys. Rev. 100, 172 (1955).

$\text{Am}^{245}$ 95 150 2.0 <sup>h</sup>	$\tau$	1.98 <sup>h</sup> 2	d 2.0 <sup>h</sup> Pu chem
	$\beta^-$	~0.86	a
	$\gamma(\text{Cm}^{245})$	0.121	scin
		0.260	

P.R.Fields, M.H.Studier, A.M.Friedman, H.Diamond, R.Sjoberg, P.A.Sellers, J. Inorg. Nucl. Chem. 1, 262 (1955).

Am <sup>245</sup> 95 150 2.0 <sup>h</sup>	$\tau$ $\beta^-$ $\gamma(\text{Cm}^{245})$	2.08 <sup>h</sup> 8 0.905 5 0.036 5 0.060 ? 0.078 ? 0.111 <sup>5</sup> 0.123 5	Pu <sup>239</sup> (pile n) chem sl 0.140 5 scin $\gamma\gamma$ 0.153 5 0.230 5 0.255 <sup>5</sup>	Cm <sup>245</sup> 96 149 1.4 x 10 <sup>4y</sup>	$\tau$ C.I. Browne, D.C. Hoffman, W.T. Crane, J.P. Balagna, G.H. Higgins, J.W. Barnes, R.W. Hoff, H.L. Smith, J.P. Mize, M.E. Bunker, J. Inorg. Chem. 1, 254 (1955).	1.43x10 <sup>4y</sup> 29 d 2.0 <sup>h</sup> Am chem
	$\alpha_K = 0.19$ (0.255 $\gamma$ ) (0.036, 0.06?, 0.078?, 0.11 <sup>5</sup> , 0.12, 0.15 $\gamma$ ) (0.230 $\gamma$ ) (0.036, 0.06?, 0.078?, 0.11 <sup>5</sup> , 0.14 $\gamma$ ) (0.11 <sup>5</sup> $\gamma$ ) (0.11 <sup>5</sup> , 0.14, 0.230, 0.255 $\gamma$ )	K/L = 5 E1 sl ce *K x ray?		Cm <sup>246</sup> 96 150 ~3000 <sup>y</sup>	$\tau$ C.I. Browne, D.C. Hoffman, W.T. Crane, J.P. Balagna, G.H. Higgins, J.W. Barnes, R.W. Hoff, H.L. Smith, J.P. Mize, M.E. Bunker, J. Inorg. Nucl. Chem. 1, 254 (1955).	2300 <sup>y</sup> 460 d 25 <sup>m</sup> Am chem
Am <sup>246</sup> 95 151 25 <sup>m</sup>	$\tau$	25 <sup>m</sup>	p ~ 3000 <sup>y</sup> Cm chem	Cf <sup>249</sup> 98 151 ~470 <sup>y</sup>	$\gamma(\text{Cm}^{245})$ 16 <sup>+</sup> 0.340 60 <sup>+</sup> 0.395 $\alpha$ (0.340, 0.395 $\gamma$ ) †Photons per 100 $\alpha$ 's	d Bk <sup>249</sup> chem scin ay
	C.I. Browne, D.C. Hoffman, W.T. Crane, J.P. Balagna, G.H. Higgins, J.W. Barnes, R.W. Hoff, H.L. Smith, J.P. Mize, M.E. Bunker, J. Inorg. Nucl. Chem. 1, 254 (1955).			F. Asaro, F.S. Stephens, Jr., B.G. Harvey, I. Perlman, Phys. Rev. 100, 137 (1955).		
$\tau$ $\beta^-$ w $\gamma(\text{Cm}^{246})$ x (1.069 $\gamma$ ) (1.22 $\beta$ , ~0.10, ~0.20 $\gamma$ ) (~0.10 $\gamma$ ) (1.069 $\gamma$ ) / (~0.10 $\gamma$ ) = 0.04	25.0 <sup>m</sup> 2 1.222 > 1.2 ~0.10 (K x ray ?) ~0.20 0.795 1.069 L x ray	d 11 <sup>d</sup> Pu chem scin $\beta$ (1.069 $\gamma$ ) scin (1.069 $\gamma$ ) $\gamma$ scin		Cf <sup>250</sup> 98 152 10 <sup>y</sup> 17% 5.980 83% 6.024 5 $\alpha$ F. Asaro, F.S. Stephens, Jr., B.G. Harvey, I. Perlman, Phys. Rev. 100, 137 (1955).	Cm <sup>244</sup> (pile n); s	
D. Engelkemeir, P.R. Fields, S. Fried, G.L. Pyle, C.M. Stevens, L.B. Asprey, C.I. Browne, H.L. Smith, R.W. Spence, J. Inorg. Nuclear Chem. 1, 345 (1955).				F. Asaro, F.S. Stephens, Jr., B.G. Harvey, I. Perlman, Phys. Rev. 100, 137 (1955).		
Cm <sup>242</sup> 96 146 162 <sup>d</sup>	$\gamma(\text{Pu}^{238})$ 0.562 E1 0.605 E1 E1 assignment from systematics		scin	Cf <sup>252</sup> 98 154 2.2 <sup>y</sup> 14 <sup>+</sup> 0.042 13 <sup>+</sup> 0.100 $\alpha$ (0.042, 0.100 $\gamma$ ) †Photons per 10 <sup>5</sup> $\alpha$ 's	Cm <sup>244</sup> (pile n); s scin ay $\alpha = 1100$ E2	
F.S. Stephens, Jr., F. Asaro, I. Perlman, Phys. Rev. 100, 1543 (1955).				F. Asaro, F.S. Stephens, Jr., B.G. Harvey, I. Perlman, Phys. Rev. 100, 137 (1955).		

## 2. NEUTRON CROSS SECTIONS

Absorption cross sections for neutron energies marked "th" (thermal) have been determined, from measurements in a thermal neutron flux, in terms of the cross section value of a "standard" for neutrons of velocity 2200 m/sec, or energy  $\sim 0.025$  ev. The standard used, when clearly stated by the experimenter, is given just after the reference and is generally one known to have a thermal absorption cross section with  $1/v$  energy dependence. If the nucleus whose cross section is being measured also has a cross section with  $1/v$  dependence, the cross section found for it by comparison with the standard will, of course, be a cross section for 2200 m/sec. If not, and the dependence often is not known, the value found by the comparison is  $\overline{\sigma v}/2200$ .

Cross sections for inelastic scattering are given in a way which indicates the experimental method used. For instance, "n, 2.00n' (90°)" in the "Type of  $\sigma$ " column, means that the cross section given is for the production of 2.00-Mev neutrons at 90° to the incident beam (in barns per steradian) and that these neutrons were observed experimentally. The energy of the incoming neutrons is given in the column headed "Energy". If it is 2.45 Mev, the energy loss in the inelastic process was 0.45 Mev. If the  $\sigma$  type is shown as "n, n' + 1.00  $\gamma$  (90°)" the cross section given is for the production of 1.00-Mev  $\gamma$ 's. In this case  $\gamma$ 's, not neutrons, were observed at 90°. The energy lost by the neutron is then 1.00 Mev or more depending on whether or not another  $\gamma$  ray, unobserved in the experiment, was in cascade with the 1.00-Mev  $\gamma$ .

Target	Energy	Type of $\sigma$	Value of $\sigma$ or $\int \sigma d\Omega$	Method	Ref.
H	380	t	0.034 2		55D46
	500	t	0.035 2		55D46
	590	t	0.036 2		55D46
	630	t	0.037 4		55D46
H <sup>2</sup>	380	t	0.057 2		55D46
	500	t	0.065 2		55D46
	590	t	0.072 2		55D46
	630	t	0.077 5		55D46
Li <sup>6</sup>	0.2 to 0.3	el( $\theta$ )	graphs	pc	56W04
Li <sup>7</sup>	0.2 to 0.6	el( $\theta$ )	graphs	pc	56W04
Be	380	t	0.233 4		55D46
	500	t	0.249 3		55D46
	590	t	0.261 4		55D46
	630	t	0.274 4		55D46
Be <sup>9</sup>	12.7	t-el	0.49 8	sphere	55T26
	14.1	t-el	0.37 8	sphere	55T26
B <sup>(11)</sup>	2.59n, n' + 2.14 $\gamma$ (90°)		0.025	scin $\gamma$	56D01
B <sup>11</sup>	12.5 to 19.9 n, $\alpha\beta 2\alpha$	table		ppl	55F20
C	12.7	t-el	0.56 10	sphere	55T26
	14.1	t-el	0.51 8	sphere	55T26
	380	t	0.286 2		55D46
	500	t	0.306 2		55D46
	590	t	0.319 2		55D46
	630	t	0.338 5		55D46
C <sup>12</sup>	7.87 n, n' + 4.43 $\gamma$ (90°)		0.060	scin $\gamma$	56H15
N <sup>(14)</sup>	th	n, $\gamma$	0.060 20	s $\pi$ pr	56C04

Target	Energy	Type of $\sigma$	Value of $\sigma$ or $\int \sigma d\Omega$	Method	Ref.
O	380	t	0.376 6		55D46
	500	t	0.398 4		55D46
	590	t	0.407 5		55D46
	630	t	0.422 9		55D46
F <sup>19</sup>	2.45	n, 1.10n' (90°)	0.024	pulsed VdG	56C05
	2.45	n, 0.88n' (90°)	0.024	pulsed VdG	56C05
	3.1 to 8.0	n, $\alpha$	graph	7.4 <sup>a</sup> N	55M86
	4.7 to 8.0	n, p	graph	29 <sup>a</sup> O	55M86
Na <sup>23</sup>	2.45	n, 2.00n' (90°)	0.040	pulsed VdG	56C05
Mg	2.45	n, 1.07n' (90°)	0.025	pulsed VdG	56C05
Mg <sup>24</sup>	0.085	t	60		56T01
Mg <sup>(24)</sup>	12.5 to 17.5	n, p	graph	15 <sup>b</sup> Na	56C22
Al <sup>27</sup>	2.45	n, 1.43n' (90°)	0.020	pulsed VdG	56C05
	3.7n, n' + 0.84 $\gamma$ (90°)		0.022	scin $\gamma$	55R38
	3.7n, n' + 1.02 $\gamma$ (90°)		0.041	scin $\gamma$	55R38
	3.7n, n' + 2.22 $\gamma$ (90°)		0.013	scin $\gamma$	55R38
	3.5 to 14.1	t-el	table	sphere	55T26
	14	p + d	0.13	ppl	56H01
	380	t	0.582 8		55D46
	500	t	0.612 4		55D46
	590	t	0.631 9		55D46
	630	t	0.645 7		55D46
Si	3.7n, n' + 1.78 $\gamma$ (90°)		0.064	scin $\gamma$	55R38
Si <sup>(28)</sup>	12.5 to 17.5	n, p	graph	2.3 <sup>a</sup> Al	56C22
P <sup>31</sup>	1.2	n, n' + 0.4 $\gamma$ < 0.05		scin $\gamma$	56V02
	1.2	n, n' + 0.9 $\gamma$ < 0.15		scin $\gamma$	56V02
	2.45	n, 1.20n' (90°)	0.052	pulsed VdG	56C05
S	14	el( $\theta$ )	graph	scin n	56E03



## Neutron Cross Sections continued

Target	Energy	Type of $\sigma$	Value of $\sigma$ or $\sigma/\Omega$	Method	Ref.
Cl <sup>(37)</sup>	12.5 to 17.5 n,p		graph	5.0 <sup>m</sup> S	56C22
A	0.07 ev	t	0.96		56H08
	0.07 ev	s	0.61		56H08
A <sup>36</sup>	0.07 ev	t	75	9	56H08
A <sup>40</sup>	0.07 ev	s	0.36		56H08
Ti	2.45 n, 1.40n'(90°)		0.062	pulsed VdG	56C05
	3.5 to 14.1 t-el		table	sphere	55T26
V	2.45 n, 1.53n'(90°)		0.017	pulsed VdG	56C05
	2.45 n, 0.82n'(90°)		0.018	pulsed VdG	56C05
Cr	2.45 n, 1.02n'(90°)		0.049	pulsed VdG	56C05
	3.5 to 14.1 t-el		table	sphere	55T26
	4.4 el(90°)		0.037	7 ppl	56W02
	4.4 t(90°)		0.066	17 ppl	56W02
Mn <sup>55</sup>	175 to 10 <sup>4</sup> ev t		graph		55B115
	0.65n, n' + 0.13γ(90°)		0.59	10 scin γ	56V02
	1.2 n, n' + 0.84γ(90°)		0.15	6 scin γ	56V02
	2.45 n, 1.47n'(90°)		0.020	pulsed VdG	56C05
	2.45 n, 1.16n'(90°)		0.011	pulsed VdG	56C05
	2.45 n, 0.92n'(90°)		0.012	pulsed VdG	56C05
Fe	1.67 el/inel (45°) = 2.7	2	scin n	55B137	
	1.67 el/inel (90°) = 0.7	1	scin n	55B137	
	1.67 el/inel (135°) = 1.6	2	scin n	55B137	
	3.5 to 14.1 t-el		table	sphere	55T26
	3.7n, n' + 0.84γ(90°)		0.135	scin γ	55R38
	3.7n, n' + 1.80γ(90°)		0.024	scin γ	55R38
	6.5 el(90°)		0.013	3 ppl	56W02
	6.5 t(90°)		0.061	17	56W02
	14 el(θ)		graph	scin n	56E03
Fe <sup>(56)</sup>	0.8 to 1.8				
	n, n' + 0.85γ(90°)		graph	scin γ	56V02
	2.45 n, 1.60n'(90°)		0.085	pulsed VdG	55C50
Co <sup>59</sup>	2.45 n, 1.25n'(90°)		0.039	pulsed VdG	56C05
	2.45 n, 0.94n'(90°)		0.035	pulsed VdG	56C05
	2.45 n, 0.70n'(90°)		0.012	pulsed VdG	56C05
Ni	2.45 n, ~1.0n'(90°)		0.052	pulsed VdG	56C05
	3.5 to 14.1 t-el		table	sphere	55T26
Ni <sup>(58)</sup>	pile n,p		0.030	3 72 <sup>d</sup> Co	56R01
Ni <sup>(60)</sup>	pile n,p		<0.6	1 mb 5.2 <sup>v</sup> Co	56R01
Cu	2.45 n, 1.48n'(90°)		0.015	pulsed VdG	56C05
	2.45 n, 0.99n'(90°)		0.014	pulsed VdG	56C05
	2.45 n, 0.83n'(90°)		0.006	pulsed VdG	56C05
	2.45 n, 0.71n'(90°)		0.004	pulsed VdG	56C05
	2.45 n, 0.55n'(90°)		0.006	pulsed VdG	56C05
	3.5 to 14.1 t-el		table	sphere	55T26
	380 t		1.17	3	55D46
	500 t		1.21	2	55D46
	590 t		1.25	4	55D46
	630 t		1.31	3	55D46
Cu <sup>(63)</sup>	12.5 to 17.5 n, 2n		graph	10 <sup>m</sup> Cu	56C22
Zn	2.45 n, 1.01n'(90°)		0.059	pulsed VdG	56C05
Zn <sup>(64)</sup>	12.5 to 17.5 n, 2n		graph	38 <sup>m</sup> Zn	56C22

## Neutron Cross Sections continued

Target	Energy	Type of $\sigma$	Value of $\sigma$ or $\sigma/\Omega$	Method	Ref.
Zn <sup>(68)</sup>	14	n, α	0.0076	8 2.6 <sup>b</sup> Ni	55B136
As <sup>75</sup>	2.45	n, 1.64n'(90°)	0.030	pulsed VdG	56C05
Se	1 to 10 <sup>3</sup> ev	t	graph		55B115
	2.45	n, 1.81n'(90°)	0.064	pulsed VdG	56C05
	2.45	n, 0.95n'(90°)	0.043	pulsed VdG	56C05
Sr <sup>(88)</sup>	12.5 to 17.5 n, p		graph	18 <sup>m</sup> Rb	56C22
Y <sup>89</sup>	0.8 to 1.8	n, n' + 0.91γ	graph	scin γ	55S92
Y <sup>90</sup>	th	n, γ	<6.5	57 <sup>d</sup> Y	55S96
Zr	0.7 to 1.2	t	graph		56G05
	0.9 to 2.2	n, n' + 0.93γ	graph	scin γ	56G05
	2.45	n, 1.51n'(90°)	0.23	pulsed VdG	56C05
	2.56n, n' + 2.17γ(90°)		0.22	scin γ	56D01
	2.56n, n' + 0.92γ(90°)		0.05	scin γ	56D01
Zr <sup>(90)</sup>	14	n, α	0.0033	6 2.8 <sup>b</sup> Sr	55B136
Zr <sup>(94)</sup>	14	n, α	0.0036	5 9.7 <sup>b</sup> Sr	55B136
Mo	2.45	n, 1.62n'(90°)	0.042	pulsed VdG	56C05
	2.45	n, 0.89n'(90°)	0.052	pulsed VdG	56C05
	4.4	el(90°)	0.036	9 ppl	56W02
	4.4	t(90°)	0.076	20	56W02
Ag	3.5 to 14.1	t-el	table	sphere	55T26
Cd	2.45	n, 1.81n'(90°)	0.039	pulsed VdG	56C05
	2.45	n, 1.09n'(90°)	0.030	pulsed VdG	56C05
	2.45	n, 0.96n'(90°)	0.030	pulsed VdG	56C05
In	14	el(θ)	graph	scin n	56E03
In <sup>(115)</sup>	14	n, α	0.0025	4 3.2 <sup>b</sup> Ag	55B136
Sn	2.45	n, 1.21n'(90°)	0.047	pulsed VdG	56C05
	3.5 to 14.1	t-el	table	sphere	55T26
	13.5	t	4.70		55M92
	380	t	1.88	4	55D46
	500	t	1.93	3	55D46
	590	t	1.98	4	55D46
	630	t	2.03	4	55D46
Sb	3.7n, n' + 1.00γ(90°)		0.075	scin γ	55R38
Te	2.45	n, 1.73n'(90°)	0.054	pulsed VdG	56C05
I <sup>127</sup>	0.40	n, n' + 0.062γ	0.30	5 scin γ	56V02
	0.65	n, n' + 0.208γ	0.31	8 scin γ	56V02
	1.18	n, n' + 0.435γ	0.44	12 scin γ	56V02
	1.18	n, n' + 0.632γ	0.59	10 scin γ	56V02
Ba <sup>(132)</sup>	pile	n, p	0.7	2 mb 6.2 <sup>d</sup> Cs	56R01
Ba <sup>(136)</sup>	pile	n, p	0.20	5 mb 13 <sup>d</sup> Cs	56R01
Ba <sup>137</sup>	0.5 to 3.0	n, n' + 0.66γ	graph	scin γ	55S92
Ce <sup>136</sup>	pile	n, γ	~20	8.7 <sup>b</sup> Ce	55B105
	pile	n, γ	~2	34.5 <sup>b</sup> Ce	55B105
Pr <sup>142</sup>	th	n, γ	18	3 19 <sup>b</sup> Pr	55S96

## Neutron Cross Sections continued

Target	Energy	Type of $\sigma$	Value of $\sigma$ or $\int \sigma d\Omega$	Method	Ref.
Ta	14	el( $\theta$ )	graph	scin n	56E03
W	380	t	2.69 4		55D46
	500	t	2.73 3		55D46
	590	t	2.78 6		55D46
	630	t	2.82 5		55D46
Re	1.0 to 2.5ev	t	graphs		55I09
Ir	0.5 to 6.2	t	graphs		55L55
Au <sup>197</sup>	0.0253 ev	a	99.3 5	1/v line	56H07
	0.0253 ev	a	99.0 20	1/v line	55G64
	14	n, > 7p	~0.11	ppl	56P02
	14	n, ~13p	0.04	ppl	56P02
Hg	16.0	t	5.49		55M92
Hg <sup>199</sup>	0.6 to 1.0	n, n' + 44 <sup>m</sup> Hg	graph	scin $\gamma$	55S92
Pb	3.4	el( $\theta$ )	graph	scin n	55B110
	3.5 to 14.1	t-el	table	sphere	55T26
	380	t	2.81 5		55D46
	500	t	2.85 3		55D46
	590	t	2.92 7		55D46
	630	t	2.94 7		55D46
Pb <sup>206</sup>	2.45	n, 1.65n'(90°)	0.051	pulsed VdG	56C05
	2.45	n, 1.01n'(90°)	0.044	pulsed VdG	56C05
	2.45	n, 0.71n'(90°)	0.032	pulsed VdG	56C05
	2.56n, n' + 0.80 $\gamma$ (90°)		0.05	scin $\gamma$	56D01
	2.56n, n' + 0.54 $\gamma$ (90°)		0.03	scin $\gamma$	56D01
	2.56n, n' + 0.66 $\gamma$ (90°)		0.017	scin $\gamma$	56D01
	2.56n, n' + 1.68 $\gamma$ (90°)		0.01	scin $\gamma$	56D01
Bi	14	el( $\theta$ )	graph	scin n	56E03
Bi <sup>209</sup>	2ev to 0.02	t	graph		55B115
	2.45	n, 1.54n'(90°)	0.032	pulsed VdG	56C05
	2.45	n, 0.85n'(90°)	0.036	pulsed VdG	56C05
	3.4	el( $\theta$ )	graph	scin n	55B110
	3.5 to 14.1	t-el	table	sphere	55T26
	15.8	t	5.75		55M92
Ra <sup>223</sup>	th	n, $\gamma$	125 15	11 <sup>h</sup> Pb	55H71
U	0.3 to 1.2 ev	t	graph		55A51
	1.0 to 1.8	f	graph		55S100
	380	t	3.25 6		55D46
	500	t	3.27 5		55D46
	590	t	3.29 7		55D46
	630	t	3.30 8		55D46
U <sup>233</sup>	0.002 to 1000ev	f	graph		55A51
	0.85	f	1.92 25		55S100
U <sup>234</sup>	0.30 to 4.0	f	graph		55L50
U <sup>235</sup>	0.004 to 200 ev	f	graph		55A51
	0.005 to 150 ev f(rel)		graph		55P48
	0.03 to 0.05	a	2.8	sphere	56M07
	0.70 to 1.0	f	1.15 15		55S100
U <sup>236</sup>	0.67 to 4.0	f	graph		55L50
Np <sup>237</sup>	th	n, $\gamma$	172 7	90 <sup>y</sup> Pu	55B140
Np <sup>239</sup>	pile	n, $\gamma$	17 + 17, -6	1 <sup>h</sup> Np	56L01
	pile	n, $\gamma$	29 6	7.3 <sup>m</sup> Np	56L01

## Neutron Cross Sections continued

Target	Energy	Type of $\sigma$	Value of $\sigma$ or $\int \sigma d\Omega$	Method	Ref.
Pu <sup>238</sup>	th	n, $\gamma$	454 8	ms	56B26
	pile	n, $\gamma$	484 7	ms	56B26
Pu <sup>239</sup>	10 <sup>-3</sup> to 100 ev	f	graph		55A51
	0.007 to 700 ev f(rel)		graph		56R12
	0.01 to 2 ev	t	graph		55G63
	0.0253 ev	t	1050 13		55A47
	0.03 to 0.05	a	2.2	sphere	56M07
	0.05 to 2.0	f	graph		55S100
Pu <sup>240</sup>	0.0253 ev	a	400 40	ms	55H55
Pu <sup>241</sup>	0.01 to 8 ev f(rel)		graph		56R12
Pu <sup>242</sup>	th	n, $\gamma$	22.9 8	Am <sup>243</sup> $\alpha$	56B26
	pile	n, $\gamma$	50.6 7	Am <sup>243</sup> $\alpha$	56B26
	pile	t	64 15	ms	56B26
Pu <sup>244</sup>	pile	n, $\gamma$	1.4	25 <sup>m</sup> Am	55F37
Am <sup>243</sup>	th	n, $\gamma$	81.6 18	Cm <sup>244</sup> $\alpha$	56B26
	pile	n, $\gamma$	131.8 17	Cm <sup>244</sup> $\alpha$	56B26
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## Neutron Cross Sections continued

55M92	M.Mazari, F.Alba, V.Serment, Phys. Rev. 100, 972A (1955); maximum value of for $E_n = 13.0$ to 16.2 is given.
55P48	B.T.Price, J. Nuclear Energy 2, 128 (1955).
55R38	M.A.Rothman, H.S.Hans, C.E.Wandeville, Phys. Rev. 100, 83 (1955).
55S92	C.P.Swann, F.R.Metzger, Phys. Rev. 100, 1329 (1955).
55S96	R.P.Smith, S.D.Reeder, J. Chem. Phys. 23, 2108 (1955); based on $\sigma_a(\text{Co}) = 34$ .
55S100	D.Szteinszneider, V.Naggiar, F.Netter, Geneva Conf. 8/P/355 (1955); based on $\sigma_p(\text{U}) = 2.04$ .
55T26	H.L.Taylor, O.Lönsjö, T.W.Bonner, Phys. Rev. 100, 174 (1955).
56B26	J.P.Butler, M.Lounsbury, J.Merritt, CRC 628 (1956); based on $\sigma_a(\text{Co}) = 36.4$ .
56C04	P.J.Campion, G.A.Bartholomew, Bull. Am. Phys. Soc. 1, No. 1, 28 GA2 (1956); verbal report.
56C05	L.Cranberg, J.S.Levin, Bull. Am. Phys. Soc. 1, No. 1, 56 R10 (1956); verbal report.
56C22	A.V.Cohen, P.H.White, Nuclear Phys. 1, 73 (1956).
56D01	R.B.Day, A.E.Johnsrud, D.A.Lind, Bull. Am. Phys. Soc. 1, No. 1, 56 R9 (1956); verbal report.
56E03	J.O.Elliott, Phys. Rev. 101, 684 (1956).
56G05	J.B.Guernsey, C.Goodman, Phys. Rev. 101, 294 (1956).

## Neutron Cross Sections continued

56H01	R.K.Haling, Bull. Am. Phys. Soc. 1, No. 1, 29 GA9 (1956); verbal report.
56H07	N.Holt, B.M.Rustad, F.Gould, Bull. Am. Phys. Soc. 1, No. 1, 70 Y4 (1956); resonance contribution included; verbal report.
56H08	D.G.Henshaw, Bull. Am. Phys. Soc. 1, No. 1, 62 UA10 (1956); verbal report.
56H15	H.E.Hall, T.W.Bonner, Bull. Am. Phys. Soc. 1, No. 2, 96 N10 (1956).
56L01	H.W.Lefevre, E.M.Kinderman, H.H. Van Tuyl, Bull. Am. Phys. Soc. 1, No. 1, 62 UA6 (1956).
56M07	R.L.Macklin, H.W.Schmitt, J.H.Gibbons, Bull. Am. Phys. Soc. 1, No. 1, 62 UA7, (1956).
56P02	R.A.Peck, Jr., Bull. Am. Phys. Soc. 1, No. 1, 40 JA8 (1956); verbal report.
56R01	B.L.Robinson, R.W.Fink, Bull. Am. Phys. Soc. 1, No. 1, 40 JA7 (1956).
56R12	R.Richmond, B.T.Price, J.Nuclear Energy, 2, 177 (1956).
56T01	A.Taylor, H.Marshak, H.W.Newson, Bull. Am. Phys. Soc. 1, No. 1, 62 UA3 (1956); verbal report.
56V02	J.J. Van Loef, D.A.Lind, Phys. Rev. 101, 103 (1956); assumed isotropic distribution for I.
56W02	J.B.Weddel, B.Jennings, Bull. Am. Phys. Soc. 1, No. 1, 55 R5 (1956); verbal report.
56W04	H.B.Willard, J.K.Bair, J.D.Kington, H.O.Cohn, Phys. Rev. 101, No. 2, 765 (1956).

## 3. GROUND STATE Q'S

Q values are defined by the conservation equation,  $M_1 + M_2 = M_3 + M_4 + Q$  or  $Q = E_3 + E_4 - E_1 - E_2$  where the  $M$ 's are the rest masses and the  $E$ 's the kinetic energies of the reacting particles. Ground state Q's are those measured when the product particles are left in their lowest energy states. If the most energetic emitted particle has escaped detection, the true ground state Q is greater than the value given.

The energy standard used, when clearly stated by the experimenter, is mentioned with the reference. Usually the energy measurement for only one particle,

either the incident or emitted light particle, presents difficulties. It is the standard used for this particle that is given.

N. B. A uniform policy for denoting the use of enriched or monoisotopic material is now in use in all four New Nuclear Data tables. This policy is described in the section on Conventions just following the introduction. Briefly, parentheses around the A value indicate natural material, no parentheses enriched or monoisotopic material.

Reaction	Value		Source		
			Detector	Ref.	
$\text{Li}^6(\text{p}, \gamma)\text{Be}^7$	5.66	5	VdG	scin	56W03
$\text{Li}^7(\text{d}, \text{p})\text{Li}^8$	-0.183	20		s	55K41
$\text{Li}^7(\text{d}, \alpha)\text{He}^5$	13.719	20		s	55K41
$\text{Li}^7(\alpha, \text{n})\text{B}^{10}$	-2.82	10	cyc	$\text{BF}_3$ pc	56R06
$\text{Li}^7(\alpha, \text{n})\text{B}^{10}$	-2.79		VdG	thresh n	56B23
$\text{Be}^8 \rightarrow 2\text{He}^4$	0.091		$\text{B}^{12}$	s	56F10
$\text{B}^{10}(\alpha, \text{p})\text{C}^{13}$	4.08	3	cyc	scin	56P06
$\text{B}^{10}(\alpha, \text{d})\text{C}^{12}$	1.341	2	VdG	EA	55C45
$\text{B}^{10}(\alpha, \text{d})\text{C}^{12}$	1.36	9	cyc	scin	56P06
$\text{B}^{11}(\alpha, \text{n})\text{N}^{14}$	0.0	3	cyc	p recoil	56Q01

Reaction	Value		Source		
			Detector	Ref.	
$\text{C}^{12}(\text{He}^3, \text{n})\text{O}^{14}$	1.148	4	VdG	$\text{BF}_3$	56B22
$\text{C}^{12}(\text{He}^3, \text{n})\text{O}^{14}$	1.148	3	VdG		56B37
$\text{C}^{12}(\text{He}^3, \text{p})\text{N}^{14}$	4.77		VdG	pp1	56J02
$\text{C}^{14}(\text{d}, \text{p})\text{C}^{15}$	-1.007	1	VdG	EA	55D34
$\text{C}^{14}(\text{d}, \alpha)\text{B}^{12}$	0.362	2	VdG	EA	55D34
$\text{N}^{14}(\text{n}, \gamma)\text{N}^{15}$	10.833	8	pile	s77 pr	56C04
$\text{N}^{14}(\text{d}, \text{n})\text{O}^{15}$	3.21	7	VdG	pp1	56N04
$\text{O}^{16}(\text{d}, \text{n})\text{F}^{17}$	-1.626	4	VdG	thresh n	55M85
$\text{F}^{19}(\text{n}, \gamma)\text{F}^{20}$	6.599	1f	pile	s77 pr	56C04



## Ground State Q's continued

Reaction	Value	Source	Detector	Ref.
$F^{19}(n, d)O^{18}$	-5.79	8	(d, t)	pc 55R40
$F^{19}(p, n)Ne^{19}$	-4.022	5	VdG thresh n	55M84
$F^{19}(t, \alpha)O^{18}$	11.847		VdG sd	56J01
$F^{19}(\alpha, n)Na^{22}$	-2.0	2	cyc p recoil	56Q01
$Mg^{25}(n, \gamma)Mg^{26}$	11.086	25	pile	s $\pi$ pr 56C04
$Al^{27}(p, n)Si^{27}$	-5.607	8	VdG thresh n	55M84
$Si^{28}(d, p)Si^{29}$	6.229	40		s 54K47
$P^{31}(p, \alpha)Si^{28}$	1.911	5	VdG sd	56V01
$P^{31}(\alpha, n)Cl^{34}$	-5.7	2	cyc thresh n	56Q01
$Cl^{35}(p, \alpha)S^{32}$	1.851	7	VdG sd	56V01
$Cl^{35}(p, \alpha)S^{32}$	1.865	15	VdG	s $\pi$ 55A50
$Cl^{35}(p, \alpha)S^{32}$	1.865	8	VdG	s 56E06
$Cl^{35}(d, p)Cl^{36}$	6.354	8	VdG	s 55P46
$Cl^{35}(d, \alpha)S^{33}$	8.277	10	VdG	s 55P46
$Cl^{37}(p, \alpha)S^{34}$	3.015	15	VdG	s $\pi$ 55A50
$Cl^{37}(p, \alpha)S^{34}$	3.015	11	VdG	sd 56V01
$Cl^{37}(p, \alpha)S^{34}$	3.026	8	VdG	s 56E06
$Cl^{37}(d, p)Cl^{38}$	3.877	8	VdG	s 55P46
$Cl^{37}(d, \alpha)S^{35}$	7.783	12	VdG	s 55P46
$K^{39}(p, \alpha)A^{36}$	1.267	20	VdG	s $\pi$ 55A50
$K^{41}(p, \alpha)A^{38}$	4.002	15	VdG	s $\pi$ 55A50
$Sc^{45}(p, n)Ti^{45}$	-2.844	4	VdG thresh n	55B116
$V^{51}(p, n)Cr^{51}$	-1.5355	15	VdG	BF <sub>3</sub> 55G54
$V^{51}(p, n)Cr^{51}$	-1.535		VdG n res	55M81
$V^{51}(p, \alpha)Ti^{48}$	1.161	10	VdG	s 55B127
$Mn^{55}(p, n)Fe^{55}$	-1.015	3	VdG thresh n	56J12
$Fe^{54}(d, p)Fe^{55}$	7.073		VdG	s 56S31
$Fe^{56}(d, p)Fe^{57}$	5.418		VdG	s 56S31
$Fe^{57}(d, p)Fe^{58}$	7.808		VdG	s 56S31
$Fe^{58}(d, p)Fe^{59}$	4.350		VdG	s 56S31
$Ni^{58}(p, \gamma)Cu^{59}$	3.43	2	VdG	scin 56G03
$Ni^{60}(p, \gamma)Cu^{61}$	4.88		VdG	scin 56G03
$Cu^{63}(\gamma, n)Cu^{62}$	-10.80	5	$\beta$ tron	$^{10}M^{62}Cu$ 56B47
$Cu^{63}(p, n)Zn^{63}$	-4.149	4	VdG thresh n	55B116
$Cu^{65}(\gamma, n)Cu^{64}$	-9.91	11	$\beta$ tron	$^{13}H^{64}Cu$ 56B47
$Cu^{65}(p, n)Zn^{65}$	-2.136	4	VdG thresh n	55B116
$Cu^{65}(p, n)Zn^{65}$	-2.131	5	VdG n res	55M81
$Zn^{68}(p, n)Ga^{68}$	-3.694	6	VdG thresh n	55B116
$Sr^{86}(\gamma, n)Sr^{85}$	-11.5		$\beta$ tron	BF <sub>3</sub> 55Y08

## Ground State Q's continued

Reaction	Value	Source	Detector	Ref.
$Zr^{90}(\gamma, n)Zr^{89}$	-11.78	9	$\beta$ tron	$^{4}M^{89}Zr$ 55F38
$Ag^{107}(\gamma, n)Ag^{106}$	-9.46	5	$\beta$ tron	$^{24}M^{106}Ag$ 56B47
$Ag^{109}(\gamma, n)Ag^{108}$	-9.18	5	$\beta$ tron	$^{2.3}M^{108}Ag$ 56B47
$Ba^{138}(d, p)Ba^{139}$	2.493	10	VdG	s 55P46
$Sm^{149}(n, \gamma)Sm^{150}$	8.00	3	pile	s $\pi$ Cp 55A46
$Hg^{199}(n, \gamma)Hg^{200}$	8.03	3	pile	s $\pi$ Cp 55A46
$Bi^{209}(p, 2n)Po^{208}$	-9.65	8	cyc	$\alpha$ Po <sup>208</sup> 56A05
54K47	L.M.Khromchenko, Doklady Akad. Nauk. SSSR 98, 761 (1954).			
55A46	B.P.Adyasevich, B.D.Groshev, A.M.Demidov, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy Phys. Math. Sci. p.270, July (1955); Consultants Bureau Trans. p.195.			
55A50	E.A.Almqvist, R.L.Clarke, E.B.Paul, Phys. Rev. 100, 1265A (1955).			
55B116	R.M.Brugger, T.W.Bonner, J.B.Marion, Phys. Rev. 100, 84 (1955); based on $Q[Li(p, n)] = 1.881 \pm 0.0005$ .			
55B127	W.W.Buechner, C.M.Braams, A.Sperduto, Phys. Rev. 100, 1387 (1955); based on $H(p, \alpha) = 331, 590$ .			
55C45	R.Chiba, R.A.Douglas, J.W.Broer, D.F.Herring, E.A.Silverstein, Phys. Rev. 100, 1253A (1955); verbal report.			
55D34	R.A.Douglas, J.W.Broer, R.Chiba, Phys. Rev. 100, 1253A (1955); Bull. Am. Phys. Soc. 1, No. 1, 21, DA13 (1956); verbal report.			
55F38	J.D.Fox, P.Axel, Phys. Rev. 100, 1249A (1955); verbal report; based on $B_p(Cu^{63}) = 10.73 \pm 0.05$ and $B_p(O^{18}) = 15.605 \pm 0.012$ . Observed threshold for $^{4}M^{89}Zr = 12.37 \pm 0.09$ . Energy of $IT\gamma = 0.59$ .			
55G54	J.H.Gibbons, R.L.Macklin, H.W.Schmitt, Phys. Rev. 100, 167 (1955); based on $Li(p, n)$ .			
55K41	L.M.Khromchenko, V.A.Blinov, Soviet Phys. JETP 1, 596 (1955); Zhur. Ekspitl' i Teoret. Fiz. 28, 741 (1955).			
55M81	J.B.Marion, R.A.Chapman, Phys. Rev. 101, 283 (1956); 100, 1375A (1955); for standard see 55B166.			
55M84	J.B.Marion, T.W.Bonner, C.F.Cook, Phys. Rev. 100, 91 (1955); for standard see 55B116.			
55M85	J.B.Marion, R.M.Brugger, T.W.Bonner, Phys. Rev. 100, 46 (1955); for standard see 55B116.			
55P46	C.H.Paris, W.W.Buechner, P.M.Endt, Phys. Rev. 100, 1317 (1955); for standard see 55B127.			
55R40	F.L.Ribe, Phys. Rev. 100, 1254A (1955); verbal report.			
55Y08	P.F.Yergin, B.P.Fabricand, Phys. Rev. 100, 1269A (1955).			
56A05	C.G.Andre, J.R.Huizenga, J.F.Mech, W.J.Rawler, E.Rauh, S.R.Rocklin, Phys. Rev. 101, 645 (1956); 93, 925A (1955).			
56B22	J.W.Butler, Bull. Am. Phys. Soc. 1, No. 2, 94, M8 (1956); based on $Q[Li^{7}(p, n)] = 1.881$ and $Al^{27}(p, \gamma)$ resonance at 0.9933.			
56B23	H.Bichsel, T.W.Bonner, Bull. Am. Phys. Soc. 1, No. 2, 93, M5 (1956); for standard see 55B116.			
56B37	D.A.Bromley, H.E.Gove, A.E.Litherland, E.B.Paul, E.Almqvist, Bull. Am. Phys. Soc. 1, No. 4, 195, N2 (1956); verbal report.			
56B47	W.L.Bendel, J.McElhinney, R.A.Tobin, Bull. Am. Phys. Soc. 1, No. 4, 192, M7 (1956); verbal report; based on $(\gamma, n)$ thresholds of $H^2, F^{19}, O^{18}$ found from Wapetra's mass values.			

## Ground State Q's continued

56C04	P.J.Campion, G.A.Bartholomew, Bull. Am. Phys. Soc. 1, No. 1, 28, GA2 (1956); verbal report.
56E06	P.M.Endt, C.H.Paris, A.Sperduto, W.W.Buechner, Bull. Am. Phys. Soc. 1, No. 4, 223, W1 (1956); for standard see 55B127.
56F10	W.A.Powler, C.W.Cook, C.C.Lauritsen, T.Lauritsen, F.Mozer, Bull. Am. Phys. Soc. 1, No. 4, 191, M2 (1956); verbal report.
56G03	C.R.Gosset, J.W.Butler, H.D.Holmgren, Bull. Am. Phys. Soc. 1, No. 1, 40, JA5 (1956); verbal report; for standard see 56B22.
56J01	N.Jarmie, Bull. Am. Phys. Soc. 1, No. 1, 28, GA4 (1956).
56J02	R.Johnston, H.D.Holmgren, Bull. Am. Phys. Soc. 1, No. 1, 21, DA9 (1956); verbal report; for standard see 56B22.
56J12	C.H.Johnson quoted by R.A.Chapman, J.B.Marion, J.C.Slattey, Bull. Am. Phys. Soc. 1, No. 2, 95, N3 (1956).

## Ground State Q's continued

56N04	I.Nonaka, S.Morita, N.Kawai, T.Ishimatsu, S.Suematsu, K.Takeshita, Y.Nakajima, Y.Wakuda, J. Phys. Soc. Japan, 11, 1 (1956).
56P06	G.F.Pieper, G.S.Stanford, Phys. Rev. 101, 672 (1956); based on $Q[Al^{27}(\alpha, p)] = 2.39 \pm 0.01$ .
56Q01	A.R.Quinton, W.T.Doyle, Phys. Rev. 101, 669 (1956).
56R06	A.B.Robbins, Phys. Rev. 101, 1373 (1956); 100, 1549A (1955).
56S31	A.Sperduto, W.W.Buechner, Bull. Am. Phys. Soc. 1, No. 4, 223, W4 (1956); for standard see 55B127.
56V01	D.M.Van Patter, C.P.Swann, W.C.Porter, C.E.Mandeville, Bull. Am. Phys. Soc. 1, No. 1, 39, JA1 (1956); verbal report; based on $Po \alpha$ and $Al^{27}(p, \alpha)$ , $Li^7(p, n)$ thresholds.
56W03	J.B.Warren, T.K.Alexander, G.B.Chadwick, Phys. Rev. 101, 242 (1956).

## 4. MASS DIFFERENCES AND RATIOS

Where no superscripts have been used with H, C, and O, the weights of the most abundant isotopes, namely 1, 12 and 16 respectively, are to be understood. Differences are given in millimass units.

	Value		Ref.		Value		Ref.
$C_4H_8O_2 - C_4H_7O_2$	+1008.16	2	56S45	$N^{14}H_3 - HO$	+23.833	8	56K14
$N^{14}H^2H - N^{14}H_3$	-1.5478	4	56Q02		+23.8159	6	56Q02, 56S45
$H^2O - H_2O$	-1.5476	5	56Q02	$N_2^{14} - CO$	+11.2441	19	55008
$H_2^2O - H_2O^{18}$	+8.3102	4	56Q02, 56S45		+11.2353	7	56Q02
$HH^2O - F^{19}$	+18.4380	14	56S45		+11.2355	6	56S45
$H_2^2O - HF^{19}$	+16.8944	5	56S45	$N^{15} - CH_3$	-23.3652	9	56S45
$H_2^2O - Ne^{20}$	+30.6872	7	56Q02, 56S45	$N^{15}H_3 - H_2O$	+13.019	5	56K14
$HH^2O^{18} - Ne^{21}$	+27.2482	7	56S45		+13.0234	4	56S45
$2H_2^2O - A^{40}$	+83.8780	26	56Q02	$O^{17} - HO$	-3.6077	5	56S45
$B^{10}F_2^{19} - S^{32}O$	+42.7730	17	56S45	$H_2O^{17} - H_3O$	-3.601	6	56K14
$B^{11}F_3^{19} - C_4H_4O$	-21.7052	13	56S45	$2O^{17}O - C_4H_2O$	-22.448	18	56K14
$CH_4 - O$	+36.3931	9	56Q02	$O^{18} - O$	+2004.875	25	56R03
$C_2H_4 - CO$	+36.3934	8	56Q02	$O^{18} - H_2O$	-11.4033	21	56Q02, 56S45
$C_3H_8 - CO_2$	+72.7870	16	56Q02	$HO^{18} - H_3O$	-11.405	8	56K14
$C^{13} - C$	+1003.680	20	56R03	$H_2O^{18} - H_2^{20}$	-8.3102	4	56Q02, 56S45
$C^{13}H_4 - HO$	+31.943	11	56K14	$2O^{18}O - C_4H_4O$	-38.080	26	56K14
	+31.9253	7	56S45		-38.0734	16	56Q02, 56S45
$N^{14} - CH_2$	-12.5803	4	56Q02, 56S45	$H_2O^{18} - HF^{19}$	+8.582	2	56K14
$N^{14}H_2 - CH_4$	-12.5803	4	56Q02, 56S45	$H_2O^{18} - Ne^{20}$	+22.392	5	56K14
$N_2^{14} - C_2H_4$	-25.1585	6	56Q02, 56S45		+22.3770	6	56Q02, 56S45
$N^{14}H_2 - O$	+23.8164	5	56Q02, 56S45	$HH^{20}O^{18} - Ne^{21}$	+27.2482	7	56S45
				$COO^{18} - 2Na^{23}$	+14.5184	40	56S45



	Value	Ref.		Value	Ref.
$\text{CF}_3^{19} - \text{C}_5\text{H}_9$	-75.2462 20	56S45	$\text{S}^{33} - \text{HS}^{32}$	-8.448 25	56S26
$\text{Si}^{28}\text{F}_3^{19} - \text{C}_6\text{H}_{13}$	-129.625 4	56S45	$\text{H}_2\text{S}^{34} - \text{C}_3$	-16.466 10	56S26
$\text{Si}^{29}\text{F}_3^{19} - \text{C}_6\text{H}_{14}$	-137.889 7	56S45	$\text{S}^{34} - \text{H}_2\text{S}^{32}$	-19.851 10	56S26
$\text{F}^{19} - \text{HH}^2\text{O}$	-18.4380 14	56S45	$\text{A}^{36} - \text{C}_3$	-32.4729 20	56Q02
$\text{HF}^{19} - \text{H}_2^2\text{O}$	-16.8944 5	56S45	$\text{A}^{36} - 2\text{H}_2^2\text{O}$	-53.5874 12	56Q02
$\text{B}^{11}\text{F}_3^{19} - \text{C}_4\text{H}_4\text{O}$	-21.7052 13	56S45	$\text{A}^{40} - \text{C}_3\text{H}_4$	-68.9344 13	56Q02
$\text{Si}^{30}\text{F}_3^{19} - \text{C}_4\text{H}_7\text{O}_2$	-75.6590 36	56S45	$\text{A}^{40} - 2\text{H}_2^2\text{O}$	-83.8780 26	56Q02
$\text{HF}^{19} - \text{H}_2\text{O}^{18}$	-8.582 2	56K14	$\text{Zn}^{64} - 2\text{O}_2$	-50.90 30	55K42
$\text{B}^{10}\text{F}_2^{19} - \text{S}^{32}\text{O}$	+42.7730 17	56S45		-50.5266 52	56Q02
$\text{Ne}^{20} - \text{H}_2^2\text{O}$	-30.6872 7	56Q02, 56S45	$\text{Zn}^{64} - \text{S}^{32}\text{O}_2$	-32.7687 32	56Q02
$\text{Ne}^{20} - \text{H}_2\text{O}^{18}$	-22.392 5	56K14	$2\text{Zn}^{66} - \text{Xe}^{132}$	-51.22 30	55K42
	-22.3770 6	56Q02, 56S45	$2\text{Zn}^{67} - \text{Xe}^{134}$	-50.50 40	55K42
$2\text{Ne}^{21} - \text{C}_2\text{H}_2\text{O}$	-22.858 10	56K14	$2\text{Zn}^{68} - \text{Xe}^{136}$	-54.40 40	55K42
$\text{Ne}^{21} - \text{HH}^2\text{O}^{18}$	-27.2482 7	56S45	$\text{Xe}^{132} - 2\text{Zn}^{66}$	+51.22 30	55K42
$2\text{Ne}^{22} - \text{CO}_2$	-7.042 24	56K14	$\text{Xe}^{134} - 2\text{Zn}^{67}$	+50.50 40	55K42
	-7.0614 12	56S45	$\text{Xe}^{136} - 2\text{Zn}^{68}$	+54.40 40	55K42
$2\text{Na}^{23} - \text{COO}^{18}$	-14.5184 40	56S45	Secondary standards calculated from doublets of 56Q02		
$\text{Mg}^{24} - \text{C}_2$	-14.9621 11	56S45	$\text{H}^1$	1.0081442 2 mass units	
$\text{Mg}^{25} - \text{C}_2\text{H}$	-21.9944 10	56S45	$\text{H}^2$	2.0147406 6	
$\text{Mg}^{26} - \text{C}_2\text{H}_2$	-33.0676 10	56S45	$\text{C}^{12}$	12.0038167 8	
$\text{Al}^{27} - \text{C}_2\text{H}_3$	-41.9548 23	56S45	$\text{S}^{32}$	31.9822401 9	
$\text{Si}^{28}\text{F}_3^{19} - \text{C}_6\text{H}_{13}$	-129.625 4	56S45	55K42	J.T.Kerr, N.R.Isenor, H.E.Duckworth, Z. Naturf. 10a, 840 (1955).	
$\text{Si}^{29}\text{F}_3^{19} - \text{C}_6\text{H}_{14}$	-137.889 7	56S45	55008	K.Ogata, H.Matsuda, Z. Naturf. 10, 843 (1955).	
$\text{Si}^{30}\text{F}_3^{19} - \text{C}_4\text{H}_7\text{O}_2$	-75.6590 36	56S45	56K14	M.E.Kettner, Phys. Rev. 102, 1065 (1956).	
$\text{S}^{32}\text{O} - \text{C}_4$	-33.0269 13	56Q02	56Q02	K.S.Quisenberry, T.T.Scolman, A.O.Neir, Phys. Rev. 102, 1071 (1956); 100, 1245A (1955).	
$\text{S}^{32} - \text{O}_2$	-17.7599 9	56Q02	56R03	B.Rosenblum, A.H.Nethercot, Jr., Bull. Am. Phys. Soc. 1, No. 1, 13 (1956).	
	-17.756 10	56S26	56S26	G.v.Schierstedt, H.Ewald, H.Liebl, G.Sauermann, Z. Naturf. 11, 216 (1956).	
$2\text{H}^2\text{S}^{32} - \text{C}_4\text{H}_4\text{O}$	-50.7852 18	56Q02	56S45	T.T.Scolman, K.S.Quisenberry, A.O.Neir, Phys. Rev. 102, 1076 (1956).	
$\text{S}^{32}\text{O} - \text{B}^{10}\text{F}_2^{19}$	-42.7730 17	56S45			
$\text{S}^{32}\text{O}_2 - \text{Zn}^{64}$	-32.7687 32	56Q02			





